CLOTHS AND THE CLOTH TRADE

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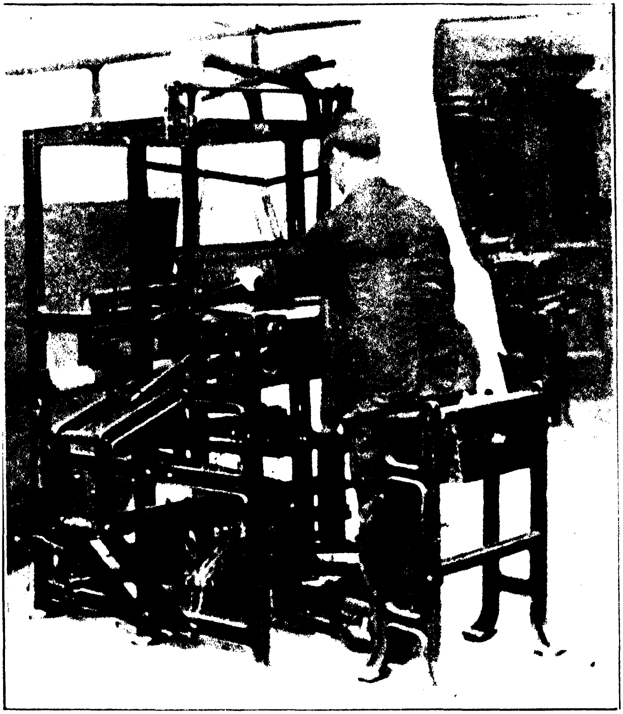

By courtesy of Mr. W. P. Crankshaw [*Frontispiece*

HAND-LOOM WEAVING

A loom of the modern type, as used for purposes of instruction or for weaving short pattern-lengths. The shuttle is jerked by hand and the warp threads are lifted by aid of the treadles

PITMAN'S COMMON COMMODITIES
AND INDUSTRIES

CLOTHS AND THE CLOTH TRADE

BY

J. A. HUNTER

AUTHOR OF "WOOL"

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INTRODUCTION

THE main purpose found for cloth is unquestionably in clothing. The term has to be liberally construed to include all the successive layers of underclothing, outer clothing, and overclothing forming parts of the European style of dress, each calling for a type of fabric different from the next, and each capable of an infinite number of modifications. But all clothing is not of the European type, and the cloths made and sold in Great Britain include types of which the public hear little—bugis, sarongs, kadungas, loonghis, kains, dhooties, pakamas, papoons, sarries, slendangs, and other popular articles of Asiatic and African dress.

These exotic types are more likely to be forgotten than the many kinds of cloths used in domestic furnishing, of which sheets, towels, blankets, curtains, table covers, dusters, carpets, leatherette, and chair coverings are by no means the whole.

The third and no doubt the least regarded group includes all the varied fabrics made for industrial use. Their uses have been much extended by the introduction of the upholstered and pneumatic-tyred motor car. The world-wide use of sacks and canvas in the conveyance of goods, the shrouding of refrigerated carcases in cotton and jute cloths, and the employment of miles of flimsy cotton cloth on tropical plantations, to shade growing crops from a too ardent sun, are named as indicative of the range of purposes. New cloth is not produced without a certain outlay of other cloths in the form of belting to drive machinery, dust cloth to preserve it from dirt, and " backing cloth " to prevent the offsetting of colours upon the calico printing machine.

In making paper and printing on paper, in pressing oil from seeds, in flour-milling and many other manufacturing operations the assistance of special forms of cloth is requisite. Even in gold-mining the virtues of corduroy have gained recognition as a means of recovering small particles of gold, and there is no suggestion that finality has been reached or that cloth will be any less necessary in the industrial operations of the future.

Cloth is made and bought definitely with its purpose in view, and, as there are unlimited kinds of cloths for every purpose, the cloth trade is perhaps the most diverse of all. The subject is not one which can profitably be discussed without reference to particular instances, and to the considerations which differentiate one kind from another. Some effort has, however, been made to confine the subject-matter of this book as far as possible to those features which are shared by cloths in common.

The book is not put forward as a contribution to the already extensive literature of cloth manufacture. Many other means are open of acquiring fuller knowledge about the manufacture of any one class of fabrics. Cloth, and not the raw materials, processes, or machinery of manufacture, is taken as the starting point, and the method has its excuses. The cloth trade has an existence dependent upon the manufacturing industry but separate from it, and the need has been widely admitted of an elementary book for the convenience of those who meet their problems in the shape of cloth rather than of raw material. Accordingly an effort has been made to present in narrow compass a simple statement of general principles, with a short account of the systems of buying and selling and of the methods employed in cloth warehouses.

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CLOTHS AND THE CLOTH TRADE

CHAPTER I

PAST AND PRESENT

THE relationship of the cloth trade to the history and public policy of the country is too intricate to be more than mentioned. "The most ancient and the most important trade the country possesses," Lord Ellenborough called it in 1800, quoting the words of Lord Hale, the Restoration lawyer, who had declared cloths "the basis of all your commerce." As regards the extreme antiquity of the trade, it is necessary only to recall Lord Chief Justice Coke's note that the first beginnings of the woollen manufacturer in this country are "ancient beyond remembrance or notice of history." The historian-economists are agreed that the cloth trade actually was the origin of the wealth of England, and that its welfare dictated national policy at many of the most critical periods in the past.

Knowledge of the earlier vicissitudes of the cloth trade is dependent largely upon the complaints published at various periods and reflected often in the passage of laws. The sale of cloth was certainly regulated by law as long ago as 1196. Encouragement was extended, about 1328, to newcomers into the realm bringing new arts of cloth manufacture. An export trade in cloth existed certainly in 1389, in which year an Act spoke of cloths sold to cogmen (i.e. maritime traders), adding that "a great part is made of the worst wools that cannot well serve for other cloths." Complaints that cloths were not what they used to be were rife in 1410, when representations were made as to deceits both in quality and measure. Welsh cloth-makers were accused in 1542 of selling their goods "so craftily and hard rolled together that the buyer could not perceive the true making thereof."

It may be advisable to distinguish between history and caricature, but a lament from Stubbs' *Anatomy of Abuses* (1583) throws some light upon the clothing in use at that time: "I have heard my father with other wise sages affirm that in his time within the compass of four or five score years, when men went clothed in black and white frize coates, in hosen of huswyves carzie of the same colour that the sheep bore them . . . ; and when they ware shirts of hempe or flax (but now thease are to grosse, our tender stomachs cannot easily digest such rough and crude meats) men were stronger than we, helthfuller, fayrer complectioned, longer living and finally ten times harder than we and able to bear out any sorowe or paynes whatsoever."

In the early years of the seventeenth century cloth-making had reached a development that can be estimated in some sort by the names of the cloths then being manufactured in Norwich. The range included bird's eye, chevron and cross-billet patterns, damasks, pile fabrics like velvets and "tufted mockadoes." Fashions had by then assumed an influence which led Dekker to write (1609) that fashion (in Adam's days) had been counted a disease and horses had died of it, "but now, thanks to following, it is held the only rare physic and the purest golden asses live upon it."

In 1613, on the evidence of the Deputy Aulnager, or cloth inspector, of the day: "If a gentleman make a livery for his man, in the first shower of rain it may fit his page for bigness." In 1653 the desire for finery and growing ambition of the poorer classes was remarked, and it was said that gentlewomen had esteemed themselves well clothed in a serge gown which a chambermaid would now be ashamed to wear. In 1678 the superseding of old fabrics by new ones led a pamphleteer to write: " Instead of the green sey that was wont to be used for children's frocks is now used painted and India-stained and striped calicoes. And, instead of a perpetuano or shalloon to line men's coats with, is used sometimes a glazened calico which in the whole is not above 12s. cheaper and abundantly worse."

In the early years of the eighteenth century that doughty champion, Defoe, contended that: " Nothing can answer all the ends of dress but good English broad cloth, fine camblets, druggets, serges and such like." In a passage relating to competing goods made in France he pictured his antagonist as replying: " Let us see now (say they) their Dog's Hair Broad Cloth, their rough half-dressed Druggets, their unshorn Dozens, their Cabbage-net Bays and let them be matched with the English Goods of the same Denomination."

The Factory Era. Defoe wrote in 1712, or some seven years before the opening, in Derby, of the first forerunner of the textile factories of the present day. In 1719 Lombe's silk-throwing mill was completed, and from that time forward mechanical development was rapid. Kay, by inventing the fly-shuttle in 1733, largely increased the productive power of the hand-loom, and, in 1760, introduced the drop box-loom, which facilitated the weaving of fancy cloths with wefts of two colours. The weaving of all-cotton fabrics was made lawful in 1774, and the first of the Manchester cotton mills was erected in 1781, by which time Hargreaves had introduced his spinning jenny, Arkwright his water frame, and Crompton his spinning mule, machines destined to revolutionize spinning and to cheapen cloth enormously. Watts produced his steam engine in the next year, and Cartwright in 1787 invented his first power-loom.

These are landmarks in the development of the cloth trade, and to them may be added the patenting in 1801 of a machine to recover wool from rags, and the introduction in 1820 of the Jacquard loom from France. In 1823 Macintosh patented the waterproof by which his name is perpetuated. In 1847 Elias Howe produced the first sewing machine, an event of first class importance to the consumption of cloth. In 1850 the chemist John Mercer patented his process of treating cotton with alkali, which more than forty years later was developed into the process now known as mercerization, whereby cotton is made into so potent a rival of silk.

The mechanical inventions of the end of the eighteenth century settled the principles upon which the enormous expansion of cloth production proceeded during the nineteenth century. The more or less rude mechanism was perfected progressively from point to point. New and large supplies of superior raw textile material became available with the greater attention bestowed on seed selection, farming, sheep-breeding, and the culture of silkworms. Chemistry made great advances, and science gradually superseded rule-of-thumb in the operations of cloth finishing. The output of cloth was enlarged, cheapened, improved, and diversified enormously, and the nineteenth century was in the main responsible for nothing less than a revolution in the methods of converting the natural fibres into cloth.

A newer development, which promises to liberate the trade progressively from reliance wholly upon the natural fibres, began in the nineteenth century, but its fuller exploitation is left to the twentieth century. The new commodity, artificial silk, made its public début in 1889 at the Paris Exhibition, and a discovery made in 1892 by the English chemists, Cross and Bevan, led to the introduction of the process by which most artificial silk is now produced. The gradual improvement of that article has enlarged the trade horizon immeasurably.

The idea that it should be possible to find a gum which could be hardened into threads like the fluid secreted by various insects was propounded by the French physicist Réaumur in 1754. Proof of the practicability of the method has been given in the most striking manner. Cloth manufacturers dependent hitherto upon particular animals and plants for supplies of raw material are supplied with a key enabling them to draw upon the basic constituent of the vegetable kingdom. The discovery implies a greater freedom from the caprices of the weather, the ravages of pests, the faults of farmers, and the fears of shortage. Instead of relying upon growing fibre to make cloth, men will tend to manufacture it, much as they manufacture dyes instead of obtaining them from woods and plants. It may appear in the fullness of time that the discovery that eligible fibres could be produced from cruder natural material ranks in importance with the discovery that flax, wool, cotton, and silk could be converted into cloth.

The Dimensions of the Trade. The present importance of the cloth trade is suggested by the figures obtained under the census of population, 1921, showing that very nearly one in eight of the working population of England and Wales derive their living from cloth. A total of 1,153,829 are employed in textile manufacture, 566,858 in the manufacture of clothing (other than boots, hats, and gloves). To these are to be added 250,858 persons employed in retail shops, and 11,261 in the drapery and clothing departments of departmental retail stores. The total exceeds two million, without taking account of Scotland and Northern Ireland, at a time when the working population is slightly over 17 million.

Even upon the diminished scale of the present, exports of British cotton cloth exceeded 4,485 million sq. yds. in 1924, with 220 million of woollen and worsted cloths, 110 million of linen, 166 million of jute cloth, and five million of silk. There were imported in 1924 over 91 million sq. yds. of silk cloth, 29 million of woollen and worsted, 41 million of cotton, and 11 million of linen.

Textiles are still so nearly the " basis of all your commerce " that they form substantially more than half of the value of exported British manufactures; or £326 million out of £618 million (1924).

CHAPTER II

PHYSICAL FEATURES OF FABRICS

CLOTH is used by measure and, with unimportant exceptions, it is bought and sold by measure, not by weight. The normal unit is the yard, or otherwise the piece consisting of a stated number of yards. In official statistics, like the Board of Trade Returns, a record is kept in square yards, but the commercial unit is the linear yard of whatever width.

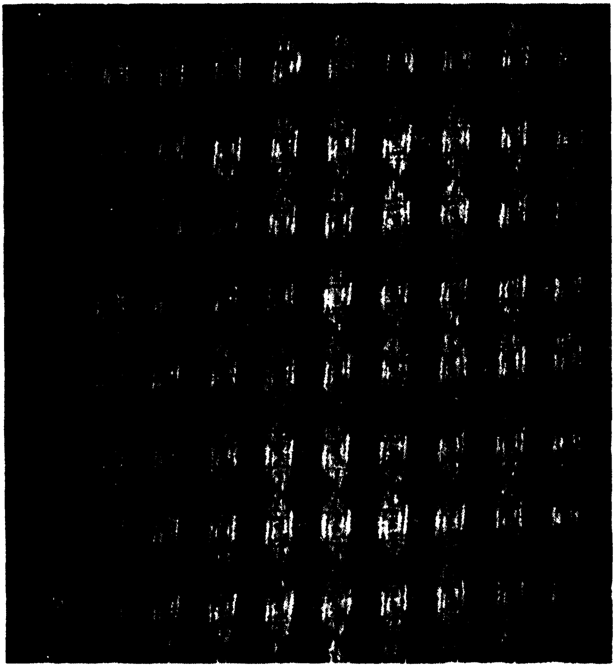
Cloth Measure. The yard, in default of definite understanding to the contrary, is to be taken as the imperial yard of 36 in. Yards shorter than 36 in. have no standing, but in particular directions over-measures are recognized. Thus there is the 36½ in. yard or " long-stick " measure sometimes used in the sale of unfinished cotton cloths, where the fraction represents a trade allowance. The 37 in. yard, of great antiquity in the woollen trade, has in part been superseded by a newer 38 in. measure intended to include the thirty-seventh inch, together with another old-standing discount, the " quarter in ten," or one yard in forty yards. To one extent or another these over-measures are absorbed by shrinkage of the material, and at retail, at any rate, cloths are sold by " net measure "—36 in. to the yard.

Cloth remnants or " fents " of odd lengths, tied together in bundles, are sold usually by weight, but otherwise the practice of selling cloth by its length is all but universal.

Piece Lengths. The piece, or full-piece, in which cloth normally makes its appearance in the market, is not a fixed quantity, although certain piece lengths have been conventionalized, and these quantities vary in respect of the different classes of goods. Cloths are often given the name of piece goods, to distinguish them upon the one hand from yarns or threads and upon the other from made-up articles of dress. Inasmuch as any portion of cloth is demonstrably a piece of cloth, the term is slightly ambiguous, but the word need not cause misunderstanding. A full piece is not properly merely one length of cloth cut off from another. It is an integer woven as one upon the loom with woven divisions at head and tail to distinguish it from pieces belonging to the same sequence and woven before or after. Pieces both longer and shorter are produced, but a piece length is oftenest some 50–70 yds.

The quantity is one of convenience or arrangement, and the variation in piece lengths from about 30–35 yds. up to 90–100 yds. reflects a compromise between the necessities of producers and distributors. Were the desires of weaving manufacturers to prevail, there is no doubt that piece lengths would all be fairly long ones, although the total yardage ordered at one time is the more important matter. Distributors do not desire lengths that give too much of one colour or pattern ; and again do not want pieces so short as to leave a multiplicity of unsaleable oddments upon cutting up.

The preference of the manufacturer for pieces of considerable length is intelligible in view of his responsibilities. The piece of a certain average length is the unit in which wholesale quantities are ordered, and an order for 10 pieces of 60 yds. is manifestly a better one than for 10 pieces of 40 yds. Before weaving can begin, a warp consisting of some hundreds or thousands of parallel threads has to be formed. Each one of the threads has to be led separately into position in the harness of the loom, and the operation, at once tedious



By courtesy of *Messrs. R. G. Maxwell & Co.*

COSTUME TWEED

The high-class tweeds in use to-day for stylish sporting costumes and skirts have evolved from primitive beginnings. Taste and boldness in colour and design, ingenious weaving, the use of fine-spun yarns and wools of the best quality, place these materials amongst the most admirable of the day and costly, is as expensive for a single piece as for ten. Economy is promoted by working with long warps of, say, 600 yds. each, sufficient to make 10 pieces of approximately 60 yds. each.

The maximum limit of warp length is determined by the capacity of the weaving machine to hold a sufficiency of material. That of piece length is subject to convenience of handling, and it is to be remembered that, in course of their finishing, pieces have to be handled wet as well as dry, and that excessively long pieces of heavy cloth surcharged with water become unmanageable. Costs and prices are calculated upon the basis of certain customary lengths, and departure from them is liable to involve added expense.

The actual length of piece forthcoming from a given length of warp is that of the warp, reduced by the amount of take-up which occurs in weaving, and modified again by the effects of cloth-finishing processes. The average ultimate length can be foretold with certainty, but individual variations cannot be exactly foreseen. Accordingly, small differences of finished length occur between pieces belonging to the same batch. If pieces of an exact length are wanted the cloth has to be cut to fit, as is done when woollens, for instance, are ordered in an exact multiple of garment length, or when calicoes are presented for retail sale in 10 or 20 yds. lengths.

Longer units than pieces are not unknown. Light cotton cloths are woven often in " lumps " of 200 yds. or so, and sent in that state to the finisher to be cut into such piece lengths as have been ordered. Quantities shorter than the conventional pieces—half-pieces or " ends," as short odd lengths are often called—can be obtained by cutting the full piece, and this is merchant's rather than manufacturer's work, and an excess charge is usually made for the accommodation.

Cloth Widths. In the nature of the case, widths are much less variable quantities than lengths, for they are measured by inches where lengths are measured by yards. Widths cannot be increased simply by employing more material, and the maximum width possible is settled by the breadth of the manufacturing machinery. Looms have in all cases to be somewhat wider than the cloths which they produce, and sometimes much wider to allow for subsequent shrinkages. They can be built several yards wide, but cloths are wanted generally in the narrowest width that is compatible with economy in cutting-out. Manufacturers equip themselves with looms of the size for which work can most regularly be found, and they find that demand is strongest for certain standard or customary widths. These range from 16–22 in. for millinery fabrics ; 27 in. (or single width) for trouserings and waistcoatings ; 31 in. common in dress-makers' linings and cretonnes ; 38–44 in. in women's dress goods ; 54–58 in. (or double width) for men's suitings, and the like up to such extreme widths as 120 in. for sheetings and so on.

Narrow looms can be run at higher speeds than broad ones, and hand-woven cloths are usually made in the narrower widths, because the work is more manageable. The modern tendency is, however, to favour the wider fabrics as being more economical in use, and the way has been led by the wholesale manufacturers of clothing, who in especial seek to avoid waste in cutting out. Broad looms can be used to weave narrow cloth, although this reduces their production and adds to the cost of weaving. The difficulty is met sometimes by weaving pieces two abreast in the loom and separating them by slitting the cloth down the middle. Such goods have only one perfect selvedge instead of two.

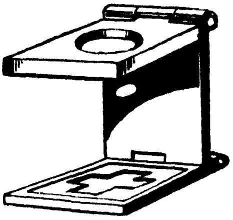
Cloth widths are measured, in default of understanding to the contrary, from edge to edge, inclusive of the selvedges or lists. Although the selvedges are ordinarily cut away in utilizing the cloth to make garments, they are in some eyes an important feature of the whole. Coloured lines are introduced sometimes into the selvedge as a decorative feature, and it is undoubted that an attractive selvedge assists the sale of cloth and adds to confidence in its quality.

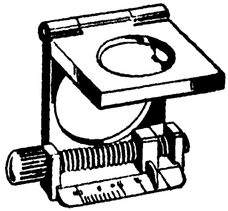
The width of cloth throughout one piece should be regular, so that when rolled or folded in plaits it presents a neat appearance. The original width is liable to be disturbed in some of the processes that the goods undergo, and it is usual to strain the cloth out to an even width before marketing it. Cloth woven too narrow can be stretched more or less, and, if the process is carried too far, the fabric shrinks in at the first opportunity.

A small margin is usually allowed to cover the slight discrepancies in width which occur from unforeseen causes, or orders are often made out for 27–28 in. or 54–56 in. width. Complaint is made if the goods are below the minimum width specified, but a slight surplus above the maximum is reckoned to the good, and it is the habit of the manufacturer of the more expensive classes of cloth to be generous in the matter of width. A small excess of width beyond the normal is welcome at times in cutting garments of abnormal sizes.

Weight and Value. Weight is an element no less essential than length and width in arriving at the comparative values of cloths, and regard is always paid to it, although the weight is not always explicitly stated. Woollens and worsteds of the kinds worn by men are customarily described by weight, e.g. 16–17 oz. the yard: meaning the linear yard of the actual width. In dealings in grey cotton cloth the weight of the piece of given length and width is often specified ; and in the case of cloths of the lighter makes the weight by the piece is a more convenient factor than the weight by yard.

The weight is an index to the amount of raw material or of yarn consumed in making the fabrics, although it has to be recognized that fictitious weight can be lent. Artificial means of increasing weight are seen in the steaming or moistening of woollens to lend them an extra pound or two a piece which will evaporate again in a dry atmosphere ; in the " sizing " of cottons with glutinous substances and mineral matter ; and in the " weighting " of silks with metallic salts or rice water. All or any of the additions may represent a real improvement to the article, but as the increase arises from the use of relatively cheap materials it confuses the issue.





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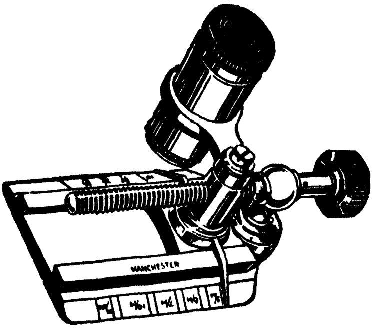
THE LINEN-COUNTER

The old-fashioned form of glass used to count the reed and pick in light fabrics

AN IMPROVED CLOTH GLASS

Traversed by rotating the milled screw seen upon the left

Weight is only a partial clue to value, for it is possible to maintain the same weight and to arrive at much the same appearance by employing coarser threads and diminishing their frequency. In general, raw materials, which can advantageously be spun fine, cost more in first instance than those which are suited only for coarser yarn. The cost of spinning fine is always higher than that of spinning coarse, for the reason that the output is proportionately less. The cost of weaving necessarily rises in accordance with the number of threads involved. Weight, therefore, can be regarded as an adequate index to value only when the quality of the raw material and the fineness and the frequency of the threads are taken duly into account.



By courtesy of Messrs. Armstrong & Brother

A COMPOUND CLOTH GLASS WITH A LENS OF HIGHER POWER

The interval is read upon the scale and the lens is traversed by means of the screw seen upon the right

Weight is not inevitably associated with warmth or even with thickness. Lighter weight cloths are ordinarily taken more for summer than for winter, but light cloths made from certain classes of raw material have a higher capacity for retaining bodily heat than heavier goods of another quality. Warmth is governed also by the way in which the cloth has been prepared, as is seen in the warm flannelettes which are produced from fabrics that in the first instance differ little from calico. Warmth is in some part a matter of texture, for the highly porous cottons used in underwear are warm when worn under a more windproof layer of clothing. Heavy and open-textured tweeds are cool in air currents strong enough to strike through the interstices.

Reed and Pick. Length, width, and weight, constituting together what may be called the overhead dimensions of fabrics, are easier to verify than the interior dimensions of which they are the direct product. The length, it has been shown, is founded ultimately upon that of the warp. The width corresponds to the lateral room occupied by a series of parallel threads set more or less closely together. The weight is the aggregate of warp and weft, subject to such deduction as must be allowed for sinkage, and to such additions as may be made in process of cloth finishing.

In taking the interior dimensions of cloth the threads have to be counted. The operation passes under various names. " Reed and pick " are the names given in the cotton trade respectively to warp and weft. " Ends and picks " are more often spoken of in Yorkshire practice. Weft threads in the linen, jute, and carpet trades are oftenest spoken of as " shots." The two dimensions are sometimes spoken of jointly as the " sett," although that term is more safely left to describe the number of warp threads to the inch as they stand in the loom before weaving. There is good reason for not referring to the totals as " counts," because that word has been appropriated to yarn, and its use invites confusion.

The method to use in counting threads is determined by convenience or practicability, and in point of fact it is exceedingly difficult to count threads in fabrics of some kinds. The regular practice in dealing with cloths of simple structure with a clearly visible thread structure is to count the threads lying within a given space with the aid of a cloth-glass or linen-counter. A quarter-inch space is convenient for dealing with cloths containing many fine threads; or a half-inch or whole inch for others. The glass is a folding instrument with a magnifying lens above and a measured aperture below. The glass is laid upon the cloth and careful count is made respectively of the warp and weft. Preferably the counting is repeated, and in testing houses, where great accuracy is essential, the average of ten tests made in various parts of the piece is taken to represent the truth.

In an improved apparatus, which has been introduced to facilitate the counting of threads, a compound lens of higher magnifying power is mounted in microscope fashion upon a metal base. The base is marked off in scales of inches and millimetres, and the eyepiece is made to travel along the scale by rotating a milled screw.

Where it is not practicable to count the threads in this manner, the alternative is to dissect the cloth laboriously from a carefully measured strip. Goods like velvets, which cannot be counted upon the face, have necessarily to be counted on the back. Simple structures having one series of warp and one of weft are much the most common, but there are others. For instance, there are backed cloths, woven with a backing weft, additional to that appearing upon the .face. There are also the reversible cloths in which two separate fabrics woven one above the other, back-to-back, are joined together by a third concealed series of warp threads.

The counting of threads gives essential, but incomplete, knowledge, because the number is merely one consideration out of several. If the quality of yarn and its fineness are equal in two samples of cloth, it follows that the one containing the more threads is the more valuable. Equally it follows that it must be the heavier.

If the number of threads in two samples is equal, and the weight of the fabric is not the same, the plain inference is that the yarns are finer in the one than the other. With the aid of the glass it is often possible to distinguish which of two closely similar cloths is really the better.

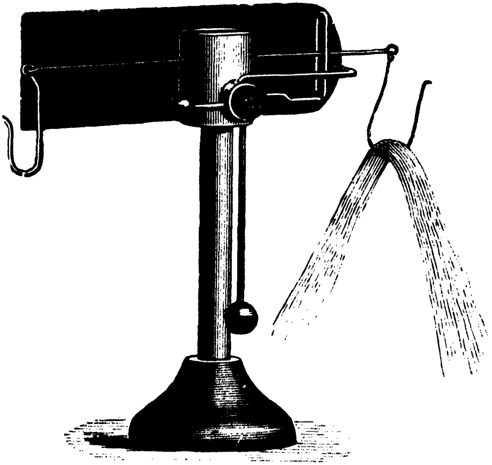
Generalities are of little assistance, but it may be observed that large differences exist in the number of threads to the inch found in different fabrics. Carpeting may have, perhaps, 12 " shots " to the inch, and in an average worsted suiting there is some such number as 40. As many as 100 picks to the inch will often be found in taffeta, and perhaps four times as many in very heavily wefted cottons made for riding breeches.

Cloths of some classes, and especially the plainer ones of light weight, are regularly made " square," i.e. with warp and weft threads equal in number, but very marked differences have to be made in order to obtain certain patterns. It is essential, for example, in whipcords that the warp threads should considerably predominate in number, and usually in thickness. In fustians, on the contrary, the picks of weft may outnumber the reed even by ten to one.

Comparison of Yarns. In ascertaining whether yarns are actually of the same fineness it is not enough to compare them by the eye. This is not solely because differences in size large enough to be important are still small enough to escape notice, but because thickness is in any case not the criterion. The " count " of yarn, being the number by which its fineness is estimated, is based not upon its appearance but upon its weight. The number signifies that a given number of yards weigh a given amount. So to ascertain the fineness or count of yarn it is necessary to weigh a known length and calculate upon that basis.

The count is fairly easily verified with the aid of apparatus when yarn can be had by the hundred yards unwoven. The work is naturally more difficult where only short stretches of thread are available, and when these have been woven and finished and possibly treated with foreign matter to increase their weight. In these circumstances scientific precision is almost unattainable.

It is, however, possible to arrive at results which serve the ordinary purposes of trade with the assistance of a neat and inexpensive apparatus, very largely used in the Manchester market. The Thomas Yarn Assorting Balance for ascertaining the counts of yarn taken from small pieces of cloth is used in conjunction with a set of templets. The sample is first cut to size, using the appropriate templet as a guide. Threads then unpicked from the cloth are gathered together and laid upon the



By courtesy of *Messrs. Thomas & Co., Ltd.*

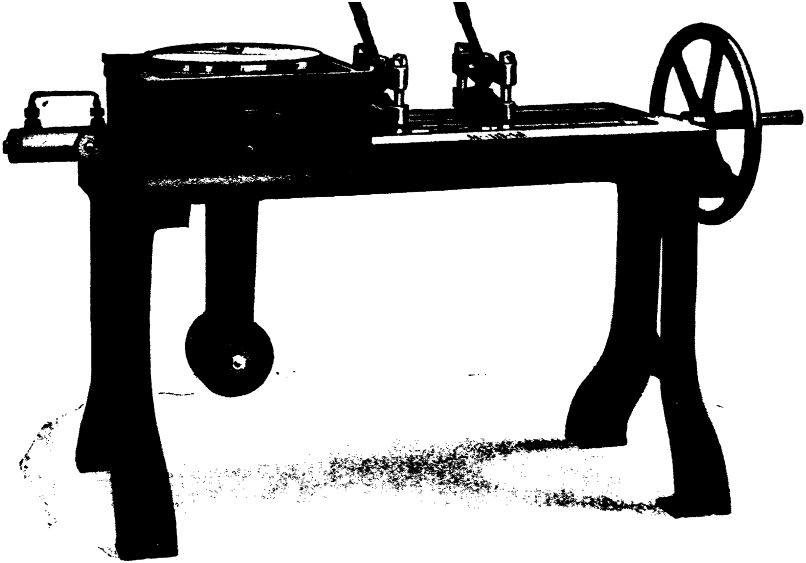
THE THOMAS YARN ASSORTING BALANCE

An apparatus for ascertaining readily the count, or fineness, of threads detached from woven cloth hook of the balance. The scale is so arranged that the number of threads requisite to balance the beam of the scale indicates the count of the yarn in question.

The counts are ascertained respectively for the warp and the weft, and where cloths made from two materials have to be tested use has to be made of two templets in place of one. Allowances have to be made for added weight due to dyeing and sizing and for loss of weight due to bleaching, as well as for the crimping or waving caused by weaving. Necessarily a small initial error is multiplied many times in working upon small samples, but the method is capable of giving information definite enough for ordinary purposes.

Tensile Strength. A certain degree of strength is demanded as a minimum from all fabrics, the expectation varying with the purpose to which they are to be put. The requirement is very low in goods which have no other function than that of being nailed down as coverings for coffins. It is high for pocket linings, workmen's overalls, and riding breeches, and extraordinarily high for aeroplane wings, army cloths, and certain classes of canvas.

Goods bought for the public services are often purchased under a strength specification, and the test applied is the breaking strain. Specimen pieces of a prescribed size are tested in an apparatus of a specified type, and those which fail to meet the standard are rejected. Limits are set separately as a rule for warp strength and weft strength, and most cloths are stronger in the direction of the warp or length, than in that of the weft or width. The main strains met in cloths employed for personal wear fall upon the lengthwise threads, and they also have to bear the chief strain and chafing in the course of weaving. Warp threads are accordingly tighter twisted as a rule than weft



By courtesy of *Messrs. Goodbrand & Co., Ltd.*

A GOODBRAND STRENGTH-TESTING MACHINE FOR RECORDING THE BREAKING STRAIN OF FABRICS threads, and, within limits, extra twist brings extra strength.

Tensile strength, recorded as the average of a certain number of tests made under particular conditions, can be accurately registered, but mechanical tests are seldom made for the purposes of ordinary trade. The strain under which cloths break under strong tension is only one consideration. Fabrics are exposed to rubbing as well as to pulling, and standards of attrition are not so easily laid down. Cloth is not customarily bought for its strength alone but for its appearance, "handle," and all-round desirability from other points of view. As to these matters there can be no scientific standard, and if the appearance is seriously affected the fact that the material has not actually broken under test is of no particular importance.

Tests sufficiently conclusive for ordinary use can be made with the thumbs. If the fabric can neither be burst nor unduly stretched by steady thumb pressure it is likely to meet all expectations of tensile strength. Many cloths can be ripped which cannot be broken by a steady pressure exerted either from the sides or the tips of the thumbs. Comparative strengths can be judged by the amount of force required in making a perceptible impression, and "tender" cloth is usually distinguished in this way. It is not always the case that a cloth tender at one end of a full piece is equally weak throughout. The end of a dyed and finished piece is often weaker than the rest, as a result of its treatment in the finishing works, and thumb tests show whether it is worth while to cut a yard or two to waste.

The critical test of strength is that of wear or use under the average natural conditions for which the cloth is intended, and it is apparent that the effects of wear are not one and the same. Rubbing causes wool cloths of certain kinds to take a polish regarded as detrimental to their appearance. Chafing produces a fuzzy surface upon some kinds of artificial silk, and this robs them of their natural lustre. In other cloths rubbing quickly removes the surface fibres, leaving a threadbare appearance. Again there are cloths in which such strains as occur at the seams or buttons cause one set of threads to slip from the other, forming a " ladder."

Strength bears no definite relation to weight, because a light cloth may prove stronger in all respects than a heavier one. Strength is associated in a degree with elasticity, and it is well recognized that cloths of some kinds show a pronounced disposition to regain their original form, if given the chance to do so, whereas others are inert. Brittleness is a natural characteristic of given raw materials ; for instance, of linen and of the more rarely met ramie. A natural elasticity can be either increased or reduced by the methods of manufacture, and tightly twisted threads, if stronger than softer ones, are generally more inclined to snap than to stretch. All or any of these characters can be accentuated or reduced by the measures taken in weaving, and even more so in cloth-finishing.

The strength of a woven structure is dependent ultimately upon that of the filaments composing the threads, and again upon that of the individual threads and upon the system upon which these threads are arranged. In the woven fabric any strain is more or less distributed, for each individual thread derives support from its neighbours, and between them they are enabled to withstand a strain immensely greater than could be borne by them separately. Particular weaves are better calculated than others to supply this support. The plain weave in which every thread passes under or over another the maximum number of times is demonstrably the most tightly bound. In all other structures the interlocking is less complete, although it does not follow that a less closely interwoven arrangement is actually less satisfactory under the conditions of wear. Weaves that leave comparatively long stretches of yarn without the support afforded by close interlacing are necessarily less favourable to the total strength of the whole. But the exact order of weaving forms only one consideration out of several. The initial tensile strength of the threads composing the cloth being the same, it is manifest that the total strength is dependent upon the number of threads lying within a given compass, as well as upon the effectiveness of their interweaving one with another.

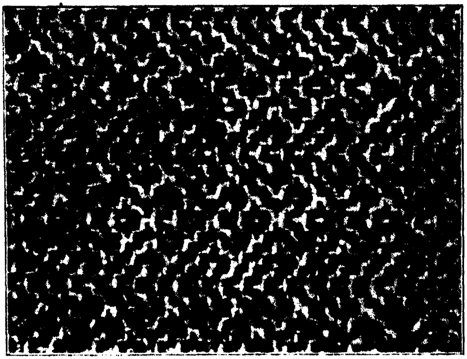
CHAPTER III

TEXTURE AND FINISH

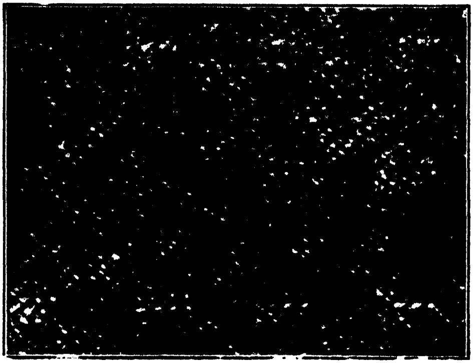
WEAVES are not adopted haphazard but are chosen carefully with definite aims in view. Not only the strength but the firmness of the fabric is governed by the effectiveness of the binding together of the threads. One weave is preferred to another as better calculated to show off the inherent beauties of the raw material—its softness to the touch, for example, or its lustrousness. Cloths can be made to feel thicker or thinner by adapting the weave, and twilled cloths in general appear thicker than fabrics plain-woven from precisely similar material.

Appearance is certainly the most considered object, and not the appearance of the cloth in the condition in which it leaves the loom, but in its ultimate state after being finished and more or less severely altered. There is no effective choice of structure when the desired appearances can be obtained only in one way, but that position is far from universal. Minor modifications are often introduced either for the improvement of the result or for greater ease and cheapness in manufacture. Importance is rightly attached to very small points in the construction of cloth.

Cloth Textures. The theoretical variety of weaves possible is limited only by the permutations and combinations which can be worked out in the positions of such groups of warp and weft threads as can be changed relatively to each other upon the loom. In the long run weaving presents two options—that of interweaving every thread at every opportunity, or that of skipping threads here and there.



(*Messrs. Kyle, Aitken & Gardiner, Ltd.*)



(*Messrs. Ovens & Shaw*)

SCOTCH TWEEDS

In intricate and showy fancy weaves

By courtesy of "The Men's Wear Organizer"

In the plain weave, to be seen, for instance, in pocket handkerchiefs, every thread is engaged with its crossing thread the maximum number of times. In the twill weaves the thread, after passing under one crossing thread, rides on top of two or more others, and when this step is arranged in regular rotation a diagonal rib is produced running across the piece. In the satin weave, also produced by floating one thread across several others, the formation of a rib is avoided by so managing the points of intersection that they do not form a visible pattern. Upon these basic weaves an endless number of modifications are founded.

By employing the plain weave, but using threads much thicker in one direction than the other, a corded or repp effect is obtained. From the use of the same order as in plain weaving, but with groups of warp and weft equal in number, a hopsack pattern results. Twills of different degrees of boldness are produced by causing the crossing threads to float for a longer or shorter distance. By the reversal of the twill at intervals a herring bone pattern is formed, and with further reversals the twill can be converted into lozenge or diamond patterns. The satin weave, which is used for purposes as various as silk satins and wool velours cloth, when elaborated with the facilities afforded by the Jacquard loom, provides ornate damask table linens and elaborate figured silks.

In addition to what can be called the ordinary weaves, there are gauze or leno weaves in which an added complication is introduced by crossing adjoining warp threads at their points of intersection with the weft. There are the pile fabrics, in which loops are formed by weaving over wires. There are lappets, as seen in Madras curtains, where an additional warp is woven down to the fabric at intervals to form a surface figure, *By courtesy of* *Messrs. Horrockses, Crewdson & Co., Ltd.*

A JACQUARD-WOVEN FLORAL DESIGN COMBINED WITH A CORDED SURFACE

Another instance of the complex character of so many of the cotton dress fabrics of the present day leaving the surplus unwoven threads to be cut away. This enumeration does not exhaust the variety.

The structures possible in a given case are limited by the capacities of the loom and the possibility of repeating the pattern within a given space. Simple looms employing a single shuttle serve for simple fabrics. Where threads of changed colour have to be introduced in the weft, more elaborate and costly machines, working with several shuttles in rotation, are required. More time and pains have to be taken over complex than simple patterns, and the work as a whole goes more slowly.

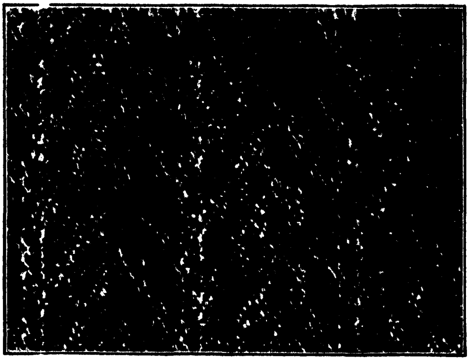
Stripes of colour in the warp are arranged before weaving, when the coloured threads are placed in position in the loom. The stripes become checks by being crossed with weft threads of the requisite colour, carried by shuttles timed to come into operation at the requisite intervals.

Faulty Fabrics. It has been said that the absolutely perfect piece of cloth never has been woven, and to this has often been added the prediction that it never will be. The meaning turns upon the definition of the adjective, because commercially perfect goods happily form the immense majority of the output. But between commercial perfection and theoretical or ideal freedom from fault there is a difference which it is unnecessary to discuss at length. One pattern can be matched with another nearly enough for all practical purposes. Well-selected raw material can be manufactured in all stages with such care as to ensure a seemingly unimpeachable uniformity, but the opportunities of deviation in one respect or another are innumerable. The degree of perfection is relative, not absolute, and the saying means that no piece is so free from flaw but that a person determined to find fault with it, and disposed to go to all lengths in the effort to do so, could find some vestige of excuse for complaint.

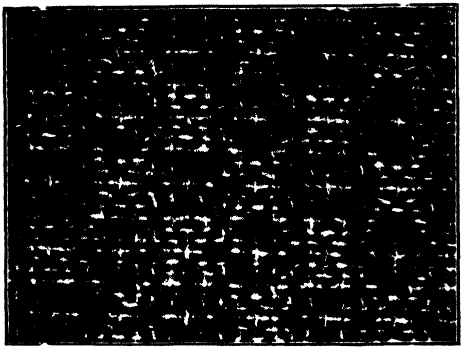
It follows that the constitution of perfection is a matter of opinion, admitting of more or less doubt, most likely to give difficulty when excuses for rejection have to be discovered at all hazards. Those who want to see merits can find them and the same is true of faults. It is a matter of common experience that complaints of defective quality are more rife when markets are overloaded and prices have fallen than in a rising, active condition of trade. The allegations made by those who want to avoid acceptance of deliveries find work for arbitrators and consulting experts. Arbitrators, out of the fullness of their experience, decide whether or not the stated defect is present, and by how much it affects the commercial value of the article or its suitability for the purpose in view. Consulting experts are concerned rather with the technical foundations of the fault alleged, and with characteristics which are discoverable only by scientific investigation.

Defects great or small are in any case to be anticipated, and it is important to decide whether these exceed the average naturally to be expected in goods of the kind and price. In the presence of an admitted defect a question remains as to its practical importance. Is or is not the fault of such gravity as to interfere with the suitability of the fabric for its destined use ? The purely technical discrepancy is one thing, the practical detriment another, and, as it is not easy to discriminate between the two, the advice of an experienced and impartial umpire is frequently desirable.

Common Defects. Apart from such verifiable particulars as length, width, weight, strength, and reed and pick, there are others more susceptible to doubt. A common cause of dispute is colour. In the event of an



(*Messrs. P. & R. Sanderson*)



(*Messrs. Ovens & Shaw*)

SCOTCH TWEEDS

Twill weaves utilized to produce telling decorative designs

By courtesy of "The Men's Wear Organizer" admitted difference of shade, who is to say that the one shade is less desirable or valuable than the other? Fortunately, faults of shade are not all irremediable. Self-coloured cloths can be redyed, if not to the original shade, then to some other saleable colour, although this way out of the difficulty is not always open in cloths woven from yarns of mixed colouring.

But in respect of colour it is not always the entire piece that is wrong. Defects occur only too often in patches. There are "shady" pieces suffering from a slight patchy discoloration, caused possibly by leaving the cloth lying in a wet state in the dyehouse, or by the influence of mildew, or arising from inequalities in the raw materials employed. Expertness is needed to determine the precise cause of the defect or to decide whether or not it can be remedied.

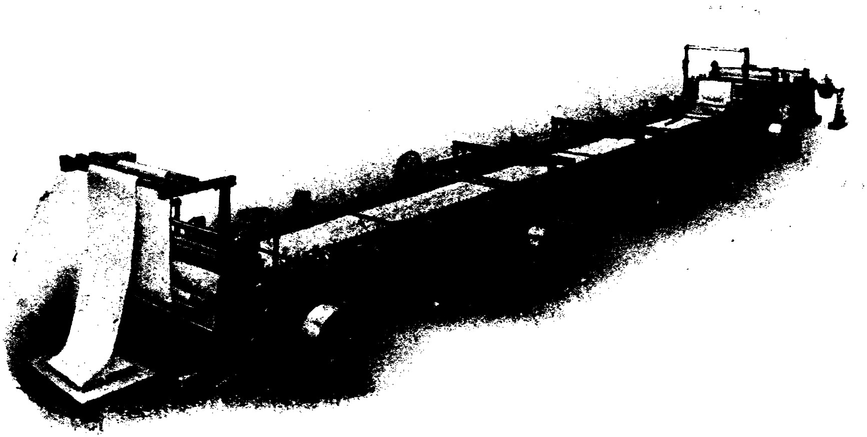
Variations of colouring occurring as bars across the width of the cloth bring the character of the weft under suspicion, and suggest the mixture in the same piece of materials which, although submitted to the same treatment in dyeing, result in the creation of different shades. Variations of shade in the warp direction incriminate the character of the warp threads, and it does not inevitably follow that for a defect apparent as a change of colour the dyer is actually responsible. The real blame is conceivably that of persons in charge of earlier processes.

Defects due to lack of uniformity in the thickness of the yarns proclaim their origin pretty clearly. "Slubs" or thick portions occur for more than one reason; they are specially liable to occur with frequency in some forms of material. Linens, for example, are often distinguishable by the fact that they exhibit greater irregularities than cotton cloths of a similar structure. Variations of thickness or thinness occur upon some scale in all yarns, and the questions of the admissibility of these blemishes is one of the standard, the price, and the purpose in view. It is possible by care in weaving to minimize defects in the smoothness of yarn, and certain kinds of cloths can be satisfactorily produced only by arranging for regular alternation of weft threads—one from one shuttle and the next from a second shuttle, turn about. Slubs can in some instances be taken out, or at least improved in appearance by skilful mending, such as is given to high-class wool cloths.

It is not difficult to decide that certain defects have arisen definitely in weaving, whether from imperfections of the material or faulty adjustment of the looms. Where " ends are out " it is apparent that something has occurred to break particular warp threads, an accident not necessarily beyond repair. Missing or incomplete " picks " show the breakage of a weft thread, and the failure of the weaver to make good the damage before continuing with the work. Inequalities of density occurring as thicker or thinner places suggest the probability that the loom has not been properly set, leaving an irregular motion either of the arrangements for letting-off the warp from its beam or for taking-up the woven cloths upon the roller at the front of the machine.

Periodical faults visible at regular intervals tell their tale of a recurrent defect in the apparatus. " Floats " may be found where the thread, instead of being interlaced properly, rides loose upon the face or back. Loops of weft are the indication of failure properly to regulate the friction of the thread as it leaves the shuttle. Rolled or faulty selvedges are not necessarily the consequence of faulty weaving, although often their irregularity has that origin.

Defects of these more obvious kinds are not the only



By courtesy of *Sir James Farmer, Norton & Co., Ltd.*

THE MERCERIZING OF COTTON CLOTH

A machine for impregnating the fabric with strong caustic alkali, holding it under tension, spraying it, and passing it into tanks where the alkali is rinsed out and neutralized in weak acid ones to attract notice. In comparing light cloths of the plainest structure it may often be seen that, whereas in the one the distribution of the threads is equal, in the other threads tend to run in pairs, creating a bare, or, as it is called, " reedy " look. It is a sign usually that the adjustment of the loom has received more care in the one instance than the other ; or that a superior type of loom has been used. Unless all the tensions are carefully regulated and the sequence of loom motions perfectly timed, the result is an imperfect general distribution of the threads. Absolute harmony in these respects, conjoined with perfectly uniform yarn, is necessary to a properly balanced plain cloth. The matter is one of standard, and evenly-woven cloth is worth more and costs more to produce than a less perfect fabric which may still serve the essential purpose.

The complexities of an intricate woven design are too apparent to be overlooked, and it is natural to regard intricacy as a great test of ability. Actually there is no severer test of the perfection at all points of workmanship and material than the production of flawless plain surfaces. A texture which shows up every trifling irregularity in the strongest relief is the most trying of any, and yarn which serves passably well for surfaces broken by some regular pattern is not suitable for plain goods of the highest standard. Accordingly, one test of judgment is the capacity to appreciate and admire the austere beauties of an absolutely plain and unadorned piece of cloth.

Finished Effects. The structure of cloth is open to examination. By use of sufficient care the raw materials can be identified, the component threads can be counted and the exact order of their arrangement noted. The finish is with good reason regarded as a greater mystery. The consequences of the treatment can be seen, although to appreciate them fully a sample of the unfinished article should be compared with the cloth in its finished state. The means taken to attain the result remain obscure, and it is frequently a task of difficulty to determine how much of the total effect is due to the raw material and the operations of manufacture, and how much to the finish.

Cloth-finishing is the art of cloth development. The work is slight in some instances and confined to cleaning, pressing, and smartening the product of the loom without substantially altering its features. In other conditions the work is revolutionary in its results, and the finish, instead of being merely the final touching-up, is effectively the most important single contribution towards the distinctive character of the goods.

In the wider aspect, finishing is held to include bleaching, dyeing, and printing, and the work falls usually to those who also perform these operations. Cloth-finishing can be, and sometimes is, carried on as a separate trade, and evidently the finish of cloth is a matter apart from its colour.

Finishers' Processes. Washing in soapy water to remove dirt, oil, and loose dyestuff is incidental to most finishes, and it is done by running the cloth continually through a washing liquor. The operation is enough in itself to modify the cloth slightly, generally in the direction of softening it, and assisting to start out a protruding fuzz of fibre in the form of a nap on the back and front of the cloth. If these fibres are unwelcome they can be removed by singeing them by heat or by shearing them off in a rotary cutting machine. If a stronger or more regular surface nap is required it can be developed by brushing with a bristle brush, or still more effectively by tearing out or " raising " the ends of the fibres by means of teazle heads or wire brushes.

The surface of the cloth is pounded by innumerable hammer blows when cottons and linens are " beetled " to soften and close the interstices of the fabric. Wool cloths are " milled " under more or less pressure to break out surface fibre, or to thicken the cloth by inducing the fibres to felt together and so reducing it in width and length. If, in course of their treatment, fabrics run up more in width than desired they have to be strained or " stentered " back to the required breadth.

According to the nature and structure of the cloth, treatment upon these lines offers opportunity of more or less change, and under skilled care the operations are carried on in such combination and for such a length of time that exactly the desired degree of change is produced. If the goods have to be stiffened, as many cotton fabrics must be, they are impregnated in starching mixtures. If, when dry, the starch is too sharp to the touch, or the fabric too stiff, the effect is mellowed by moistening the fabric or passing it over a machine, which breaks up the adhesion of the starch particles.

Pressing, hot or cold, between rollers under either light or heavy pressure, or by means of a hydraulic ram, is usually the concluding process. Alternate steaming and pressing is often relied on to give a lustrous finish, and the rollers or " bowls " used in pressing are engraved in some instances either to emboss a pattern upon the cloth or, as in " schreinered " cottons, to heighten the brilliance of the surface by scoring it with an infinitude of imperceptibly fine lines.

Chemical processes are employed, as when cotton cloth is mercerized by being immersed in caustic alkali and pulled out again in width after having been contracted by the strong liquor. New finishes in which extended use is made of chemical effects are exploited, and they add to the myriad characteristic results which are obtainable by mainly mechanical means.

Cloths are manufactured in general with their ultimate finish in view, and they are affected or liable to be affected by it in almost every respect. The length, width, and weight are directly concerned. The strength may be either largely increased or heavily decreased according to the conditions of the case. Their thickness and warmth-giving power, their dullness or brightness of surface, their softness or hardness to the touch, their limpness or stiffness are largely controlled by the finishing processes. The points of difference in the finish of one and the same class of goods are infinite in number, and a piece of plain calico can be finished easily in a hundred styles all recognizably different from one another.

Cloth in the condition in which it leaves the loom and before being dyed and finished is said to be " in the grey." The term is not quite the only one for the unfinished state. Nottingham lace curtains are " in the brown," and some linens " in the green " until they are treated by the finisher, and undyed woollen cloth is in some districts " in the balk." The names have little relation to the actual colour, and are to be understood as descriptive of their unfinished state rather than of their precise shade.

Bleaching. Cottons and linens are converted from their natural more or less dingy colour by bleaching ; in other words by boiling, usually with lime or soda, and by being acidulated and treated with chlorine oftenest derived from bleaching powder. Bleaching is carried to one extent or another according to the purity of white demanded. Goods for dyeing to light shades or for printing in colours require bleaching, but not such drastic treatment as cloths intended to be sold white. The treatment does not aim only at removing discoloration, but also at taking away such natural impurities as the vegetable waxes which are found in cotton and linen.

By courtesy of *Messrs. Mather & Platt, Ltd.*

FOR BLEACHING COTTON AND LINEN

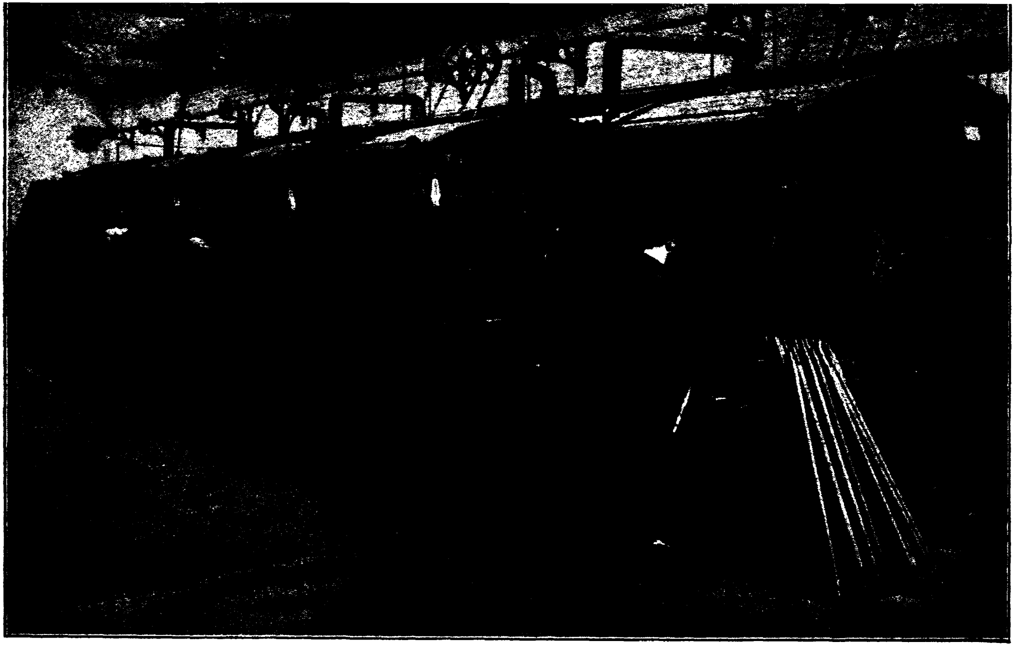
A kier, or closed vessel, in which the material undergoes boiling at high pressure for the removal of natural colouring matter

Wool goods are dealt with in quite a different manner. White flannels and blankets are ordinarily "stoved" in sulphur fumes, and cream serges are often further whitened in peroxide solutions. Silks, if the desired whiteness cannot be obtained by boiling in soap, are also treated with such reagents as peroxide.

Cotton and linen are rendered much more absorbent of water by bleaching, their natural lustre is improved, their weight is somewhat reduced, and their strength is not necessarily deteriorated. The same quality of cloth can sometimes be bought retail both in a bleached and a more or less unbleached condition, and there is a prejudice on the part of some housewives in favour of unbleached sheets and calicoes. They prefer, in effect, to do the bleaching themselves by dint of a periodical washing and drying, which gradually whitens the fabric.

Dyeing. Cloths are not necessarily dyed in cloth-form and, except upon the important grounds of convenience and expense, are the better for having been dyed in an earlier stage of existence. Loose wool and cotton absorb more dyestuff and are more thoroughly penetrated than when treated in a more advanced form. Accordingly wool-dyed cloth is regarded as superior to yarn-dyed, or than cloth of the same quality piece-dyed with the same dyestuff. Material has necessarily to be dyed loose, or in the slightly advanced "slubbing" state, when it is to be spun into a thread of mixture colourings.

Yarn dyeing is practised chiefly to obtain warp and weft for such coloured patterns as checks and stripes, although also upon the richer, heavier descriptions of black silks. Piece-dyeing, in which a previously uncoloured piece is treated, has the great advantage that the cloth can be made first in its natural white or grey, and be coloured at will later. If the thorough penetration of the dyestuff is less secure, at least the method reasonably assures that the whole piece shall be of the same shade, for it is all dyed at once, whereas differences are liable to occur between yarns dyed in separate batches.



By courtesy of *Messrs. J. & J. McCallum, Ltd., Paisley*

FOR DYEING YARN

Piece-dyeing is, therefore, employed as far as possible and not necessarily for self-coloured cloths only. " Cross-dyeing " can be done by this method, for instance, upon cloths half-wool and half-cotton, and dyes can be chosen which will affect only one of the two materials. The dye can be prevented from affecting given threads or portions of the cloth by protecting them with a " resist " ; or—although this is an operation rather for textile printers than dyers—the colour applied by dyeing the cloth can be removed or " discharged " by subsequent chemical treatment, so forming a regular pattern.

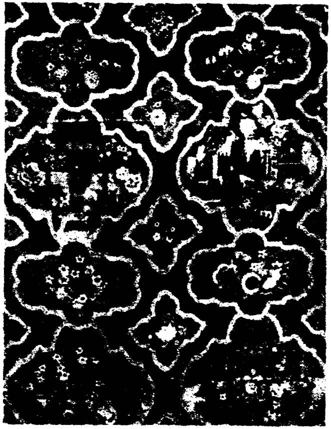
Cloth is dyed ordinarily by immersion in a dye solution more or less heated, and generally in machines of a size to treat a certain number of pieces at once, often five or ten. The pieces are stitched end to end and are circulated in the dye liquor until the desired depth of shade has been reached. Pad-dyeing, in which the colour is applied to the cloth by a roller in course of a rapid run through the machine, gives less perfect penetration, as can sometimes be seen from the uncoloured centre of a thread detached from the fabric.

Although a single bath is all that is required when dyestuffs of certain classes are used, a second treatment is necessary in other cases to fix the colour. Repeated dyeings are required to obtain dark shades from some of the less soluble classes of dye wares, and this, in conjunction with the high price of the dyestuffs, may mean that the dyeing will cost still more than the material dyed, although that position is exceptional. The cost is highest generally in the case of the colours of greatest permanence and brightness. Bright but quickly-fading colours are not expensive, and dull colours as a whole are less inclined to fade.

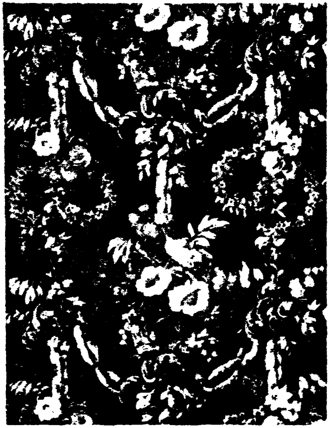
The lighter and brighter shades involve more preliminary treatment, because the cloth has to be brought to a closer approach to white beforehand ; and dark shades can in many instances be dyed upon discoloured material. The chance of spoiling light-coloured goods in course of the process is greater, and a higher charge is made for dyeing light and fancy shades than for black and blue. Pains have to be used to keep the light shades from contamination, requiring sometimes the filtering of the air in the dyehouse and the careful covering of the cloths from dust. The greatest of care has to be taken in respect of white or cream-coloured cloths, and, as materials eligible enough for dyeing to dark shades may be unsuited for white, it occurs that white cloths cost sometimes more than coloured goods of the same range.

Dyeing prices are maintained at definite standards in most quarters by combinations of the firms of dyers who work for the trade. The price charged is usually based upon the weight of material with varying rates for goods of separate classes, and the charge normally includes the finishing and delivery of the cloth. Prices are lower in general for work which can be dyed in large batches than for smaller quantities, and are highest for the goods which involve most difficulty and risks.

Fast Colour. Purity and brightness of shade are two of the chief desiderata in dyed goods, and another is that the colours should be " fast." The word has no absolute significance, and is used in different senses. Colour may be fast, for instance, against rubbing and yet not against washing or boiling. All colours are affected in some degree by sunlight, but the relative fastness to light is of prime importance, and fastness against perspiration and street mud are sometimes demanded. The whole scale of fastness is a relative one ; relative to the material, the purpose, the conditions of use, the brightness and the depth of shade, and the



(*Messrs. Turnbull & Stockdale*)



(*Messrs. Stonards, Ltd.*)

MODERN CRETONNES

The pattern upon the left-hand block printed upon linen

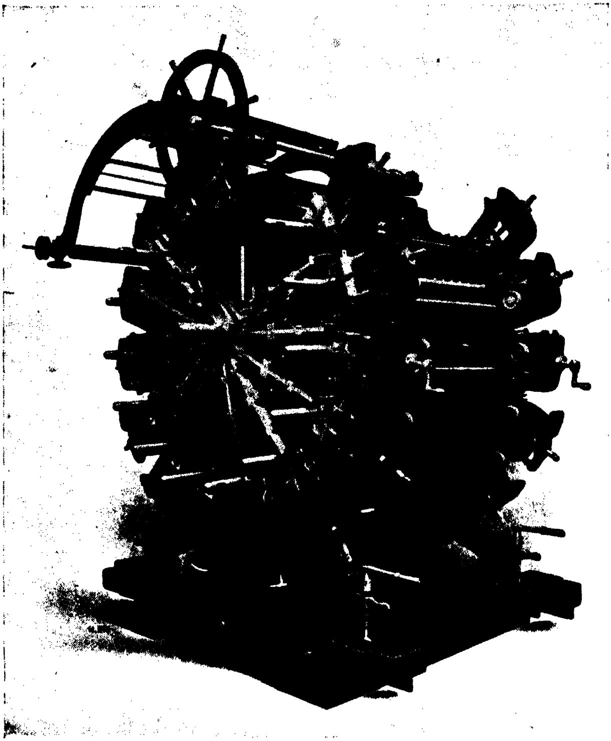
By courtesy of " The Furnishing Trades' Organiser."

price. The standards set up are individual ones, and the meanings placed upon the word " fast " vary widely.

A stronger word than " fast " is used to describe such cloths as are used for curtains, but " fadeless " has usually no more definite meaning than that the seller will replace the article should it fade within what is agreed to be a reasonable time. Each one sets his own standard, and uniformity is hardly conceivable, in view of the wide range of shades, some embodying much dyestuff and some relatively little. To say that a colour fades is to say nothing definite about it. The practical question is not whether it shows any change at all, but rather how much change. Does or does not the inevitable alteration appreciably interfere with the enjoyment and use of the article ?

Printing. Printing offers what is almost always the cheapest and quickest method of producing fancy coloured patterns upon cloth. If the coloured design must be obtained by weaving the patterns and colours, it must be foreseen from the start. Full preparations have to be made specially at every stage, possibly at large expense. Where a printed effect will suffice manufacture is simplified, for cloth suitable for printing can be woven in the grey condition and be printed in any pattern and colours or combinations of colours.

Wool cloths are not often printed, as the material does not lend itself readily to the work, and linen is less easily treated than cotton or silk. Cotton prints are immensely more plentiful than any others, and the process is known generally as calico printing, although many cottons other than plain calico are submitted to it. Printing is not done only upon cloth. Yarn is printed before weaving to make tapestry carpets, and to produce the shadow-like chiné patterns sometimes seen in cretonne covers.



By courtesy of *Messrs. Mather & Platt, Ltd.*

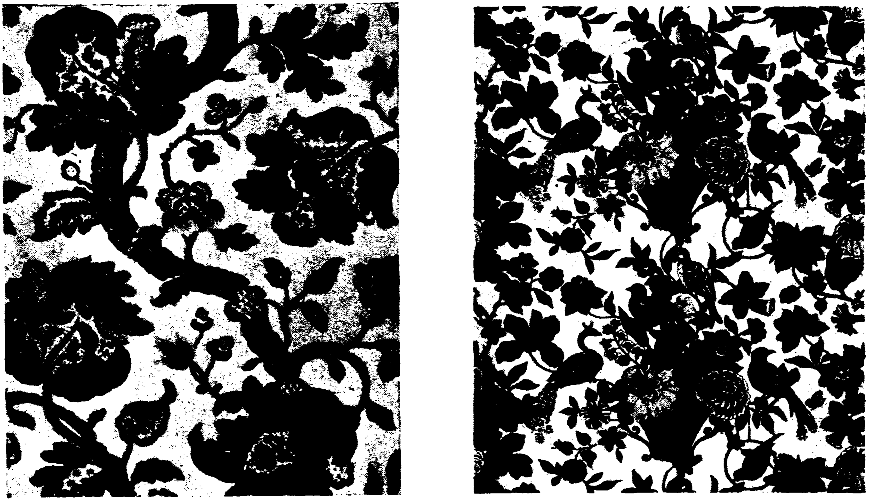
FOR PRINTING CALICO

Twelve printing rollers, each with its separate colour trough, are set round the large drum, and in course of transit through the machine the cloth receives an impression from each

The readiest method, however, is to print upon the surface of the cloth, after it has been prepared sufficiently by bleaching. The original printed cloths were hand or block prints, stamped by hand with small wooden blocks moistened with colour paste. The old method is still practised for the production of small quantities for sale at comparatively high prices. Machine work is much more economical in making large quantities to one pattern, and the printing is done by engraved cylinders. A separate roller is prepared for each colour and the colours may number as many as 16 or 20. The expense rises with the number of colours employed, and an important part of the art of calico printing is to obtain the effect of many colours by the use of few. The simplest form of printing is the production of single-colour patterns, and the most complex involve combinations of several processes whereby one and the same paste is made to give different colours in different parts of the design.

Printed designs can usually be distinguished from woven patterns by comparing the back with the front of the cloth, although in duplex printing a design is printed upon the back as well as the face. The printed pattern tends to look blotchy and indistinct in rear, because the colour paste spreads in percolating through the cloth. When a printed thread is detached from the fabric, patches of different colours are seen to occur along its length, plainly showing that the colour has not been placed there by dyeing.

The effect of printing is more superficial than that of weaving with coloured threads, but not necessarily less permanent. The permanence is dependent upon the dyestuff and upon the method by which it has been fixed. The fastness of the colour should be, and usually is, proportionate to the durability and value of the



(*Messrs. Franklin & Franklin*)

(*Messrs. Stonards, Ltd.*)

DECORATIVE FURNISHING FABRICS

Handsome prints in many colours

By courtesy of "The Furnishing Trades' Organiser" material, and the purpose for which it is designed. The method allows of the production of cloths in patterns and colours of great beauty, at a mere fraction of the cost that would otherwise be incurred, and at great speed. It is subject to natural limitations, for the cylinders are of fixed width and that of the cloth may not exceed them. The rollers are expensive to engrave, but once made are available for use in any colours at will. As the market demand for any one fancy pattern is limited, any produced in excess of that quantity may have to be sold off at a heavy reduction. Small quantities have to bear considerably heavier standing charges than large ones, and the economy of printing is a good deal dependent upon the length of the " run."

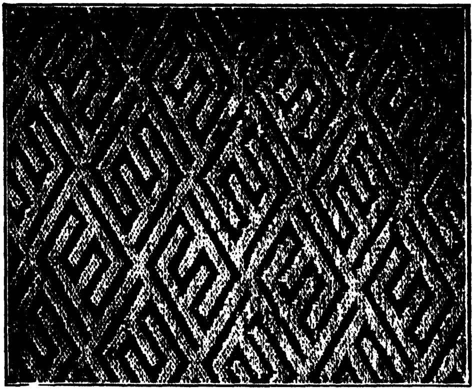
CHAPTER IV

CLOTH-MAKING MATERIALS

THE vegetable kingdom supplies much the larger part of the materials of cloth manufacture, and the animal kingdom the rest. An occasional use of such mineral material as tinsel or gold wire in evening dresses, or as asbestos in heavy fireproof curtains, does not seriously affect the case. The first step in identifying the nature of fibre found in cloth is to determine whether it is animal or vegetable in origin. The point is easily cleared with the aid of a flame, because the vegetable materials burn freely and the animal fibres with difficulty. Artificial silk, although it is the product of chemical processes, is fundamentally as much a vegetable fibre as cotton, linen or jute, because, like them, it is a compound of cellulose.

Identifying Fibres. The simple test with a match flame is decisive upon the main point, for if the fibre is wool it does not light readily, burns languidly, swells and gives off an ammoniacal odour. Silk, still less combustible than wool, and more inclined to swell and form a knob of charcoal which eventually extinguishes the flame, emits a more fatty smell on burning. The behaviour is altered somewhat if the silk has been heavily " weighted " in dyeing, for then a crust of mineral matter is left after burning and this may be heated and reheated, like a length of wire, to redness again and again.

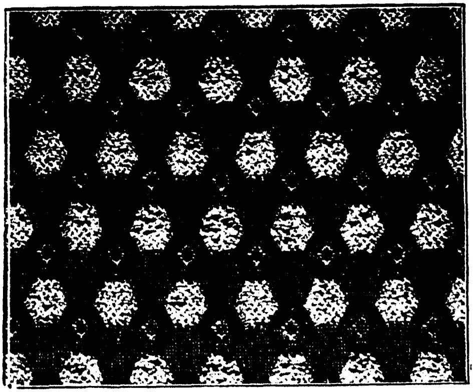
The flame test is less reliable as a means of distinguishing one vegetable fibre from another, although, on the whole, linen, because it contains more resin, burns



(*Messrs. Haslams, Ltd.*)

A MODERN LINING

Made in artificial silk and cotton



(*Messrs. Forrest, Frew & Co., Ltd.*)

FOR LADIES' DRESSES

A combination of artificial silk with wool

By courtesy of "The Drapers' Organizer" more fiercely than cotton. Artificial silks can be distinguished readily from natural silk by the burning test, and even one class of artificial silk from another, because viscose silk and acetate silk, the two forms most commonly met with, behave rather differently under the flame.

A wool thread feels harsh and gritty when bitten between the teeth ; a cotton thread flattens when thus bitten ; and a silk thread is fairly readily cut by the teeth. Artificial silk loses so much of its strength on wetting that it can usually be identified by testing its resistance with the fingers, first in the dry and then in the wet state. The question whether a given thread is cotton or linen can be judged in various ways. Linen is stronger but more brittle than cotton, and when a linen thread is snapped the fibres tend to break off clean. Linen yarn is usually less uniform than cotton, and more slubs or inequalities appear in the cloth. More conclusive proof is given by the length of the fibres, for whereas cotton is between one and two inches in length, linen fibres may be many inches long. Microscopic examination puts the question out of doubt, revealing the cotton fibre as a flat and twisted tube and the linen as angular and as composed ultimately of short components, attached side by side, to constitute a much greater length.

Composition and Character. Necessarily, cloths are for many purposes classified according to the kind of raw material from which they have been made, although their composition is not invariably their principal title to interest or a thorough guide to their character. Manifestly, there are differences between cottons and cottons as important, from a practical point of view, as those between some cotton and certain woollens, linens or silks. The case is the same, whether regard is paid to physical feature or to commercial value, and, when an entire novelty in fabrics is placed upon the market, the first question is not what the goods have been made from, but what they are fit for and what they are worth. The question of composition may have an important bearing upon the cost of production, or upon the price which can be asked in reselling, but it is not all-important.

Cloths are judged upon their total merits rather than upon the individual merits of their components, and it is a legitimate exercise of the art of manufacture to arrive at an acceptable result by the use of unaccustomed materials and methods. How he shall achieve his effects the manufacturer regards rightly as his own business, and he demands to be judged by the product of his skill, not by the detail of his methods.

Questions of Quality. In any case the identification of fibres according to their kind is merely a bare beginning, for there are innumerable qualities within each kind. Long experience and constant practice are required in judging, to good purpose, the quality of textile raw materials before they have been manufactured, and the task is not in all cases easier after they have been put under some disguise. Beginning with fibre shredded out from the woven article, the expert may form a clear picture of the fibre in its initial state, much as the scientist is able to reconstruct the proportions of an extinct mammal from a single bone. Those who have been denied a training in all branches of textile manufacture have perforce to content themselves with such information as is supplied by examination of the total effect as displayed in the cloth, amplified by the small hints obtainable from dissection of a sample.

With the exception of certain silks and artificial silks, all the yarns used in cloth manufacture are formed from masses of loose, discontinuous fibre. In process of manufacture the fibres are combed or teased into order and put into slack ribbands, and these, having been drawn out to sufficient fineness, are twisted to hold the material together. Fibre can be unravelled from these threads and opinions can be formed about it.

If the twist is sufficiently loosened, fibre can be pulled from it with thumb and finger. By pulling out the fibres individually, choosing always those that project farthest and laying them carefully on a coat sleeve or a velvet surface, an idea can be obtained of the maximum and the average length of the staple, and in many conditions uniformity of staple is a first consideration. The longer-stapled fibres can in general be spun finest, and, with some exceptions, a close uniformity in the length of the staple assists to produce a brighter and more uniform yarn. Long staple and short staple are strictly relative terms of very different meaning in connexion with the several forms of fibre. A long staple of cotton, for example, would be a very short one in wool. Cotton is graded very high in accordance with the length of staple, and the differences are measured by the fraction of an inch. In ordinary American cotton the range is about ¾ in. to 1 in., whereas Egyptian cotton ranges up to 1¾ in., and Sea Islands to 2½ in. Length is not the whole matter, but has to be taken in conjunction with diameter, softness, lustre, and purity of colour, not all of which properties are ascertainable in material which has been converted into cloths.

Not all cotton is first-hand material, and use is made of cotton waste, for example, in the weft of cheap sheetings, in the lower priced flannelettes, and in sponge cloths, and coarse heavy goods generally. Distinction is difficult between the lowest grades of cotton and the best grades of waste, and, in judging whether goods are made from waste or from cotton, assistance is derived from looking at the thread, rather than at the fibre, and noting whether lumpiness of surface seems to indicate the presence of staples of markedly irregular lengths. " Condenser " weft, as it is often called in recognition of the process by which it is made ready for spinning, is made generally from cotton waste.

The differences in staple between one wool and another are on a comparatively gigantic scale, but the value is more definitely related to the diameter than to the length. Short coarse wools are not valuable, but short fine wools may be worth more than any. The longest wools, which may be as much as one foot in length, tend to be straight, coarse, and wiry, whereas the fine are three to four inches in length, and wavy or crimped. These differences in the quality of wool are appreciable to the touch as well as to the eye, and well-trained buyers are able to recognize the quality of the raw material by fingering the cloth.

Wool cloths in the main are made upon one of two systems. Worsted which gives bright, neat, compact cloths, and employs generally the longer staple in each quality of wool; or woollen, which provides tweeds, flannels, melton, velours cloth and the like, and employs the shorter classes of wool. In worsted thread the fibres are found to lie parallel, and in woollen a less orderly arrangement is adopted. In woollens waste wool or shoddy can be employed, and there are as many differences in shoddies as in the wools from which they come. There is no golden rule enabling shoddy to be distinguished from wool, but usually the fibres are shorter and often there are small indications which allow a shrewd guess to be made at the past history of the material.

The quality of linen is in the first place that of the flax, and this varies much according to its origin and preparation in the fields, modified by its treatment in manufacture and the cutting away of the inferior tops and bottoms of the flax stems. Two main kinds of flax goods are to be distinguished—" line " made from the middle of the stems, and " tow " from flax waste, thicker spun and more irregular.

Raw silks are no more uniform in quality than any other of the natural materials, although the differences between the kinds produced in the various silk-growing countries are not easily distinguishable in the manufactured state. One distinction, too broad to be always disguised, is that between cultivated and wild silk. Worms feeding on the mulberry and receiving skilled attention produce a smoother, finer, softer and more brilliant silk than the tussah moths feeding upon oak leaves, whose silk is harsher and less easy to dye to good shades. Raw silk is not discontinuous fibre but a thread, possibly 1,000 yds. long, obtained by unwinding the silk from a small cluster of cocoons. The smallness of the thread and its freedom from irregularities are one index of its value. Although at one time raw silk was invariably further treated before manufacture into cloth by silk throwsters, the greater part of the light silk fabrics of the day are woven from raw silk on power looms and then piece-dyed, whereas they were formerly hand-woven and yarn-dyed.

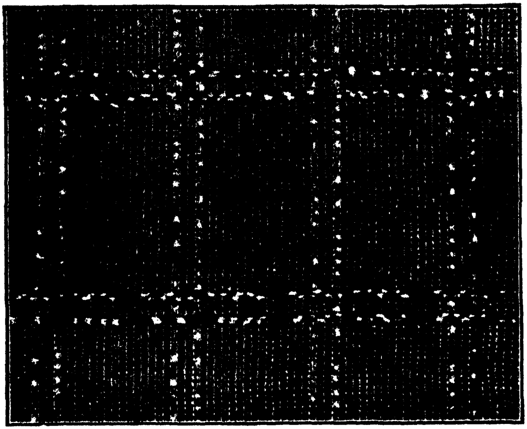
An easier distinction is that between " raw," " thrown " or " net " silk, and the so-called " spun " silk or schappe. The portions of the cocoons rejected in silk-reeling are converted into yarn by methods not greatly different from those employed in treating worsted, flax or cotton. Spun silk is usually thicker than net silk, and on examination is found to be composed by loose fibre ranging perhaps up to 8 in. in length In the woven state it has a perceptibly fuller and more clothy handle than net silk. It may be found often in blouse cloths or as stripings, and it is much employed in velvets, where it is difficult of recognition. Still another grade of silk has come into prominence since its large use in munitions of war. "Government silk," made of relatively thick and knotty threads, is "noil" silk, manufactured from the short fibre remaining from the production of spun silk.

Artificial silk has been produced hitherto chiefly in the form of a continuous thread, analogous to the net silk wound from the cocoons of the silkworm. The thread is a bundle of finer and practically endless filaments somewhat loosely combined together. The waste material generated in that process is treated in broadly the same manner as silk waste to make a cheaper, heavier, and generally less lustrous artificial silk waste yarn. It is possible that, in the future, artificial silk prepared in this manner will attain a larger importance. Efforts are being made to produce a so-called staple fibre, consisting of filaments a few inches long, which can be spun into threads of varying fineness upon the spinning frames in regular use in the textile trades.

Mixed Fabrics. The desired ends can often best be met by employing a mixture of materials, and the mixtures are made for many different reasons in either of two chief ways. It is not invariably practicable to blend fibres of two kinds in their loose condition and spin them together in one thread. That method is pursued, however, in woollens (as distinct from worsteds). Cotton and short wool are blended occasionally to make flannel-like fabrics of a less shrinkable character than all-wool, but more often to strengthen weak waste wool and to bring in a fairly durable fabric cheaply. Blends of loose material are made also for the sake of appearances, as when waste artificial silk is added to wool to produce a bright, fancy effect.

Mixtures of composition are more often effected in the form of separate threads. The mixture proclaims itself when more or less isolated threads of bright surface are introduced among a groundwork of duller material, but in many instances the admixture is concealed. In the so-called " union " cloths, the warp is from one material and the weft from another, and, although this combination is often chosen for cheapness, that is not so invariably. There are fabrics in which the more expensive of the two components is stowed out of sight ; for instance, in costly shirting, and dress goods, where fine silk is employed as warp with wool as the weft. The silk used is smaller than the wool in diameter, and usually more lissom and pliable, but cotton warps are much more often employed than silk. The cotton occasionally forms not the warp but the weft, and, when used in conjunction with wool or silk, it serves as a kind of stitching to bind the salient material together.

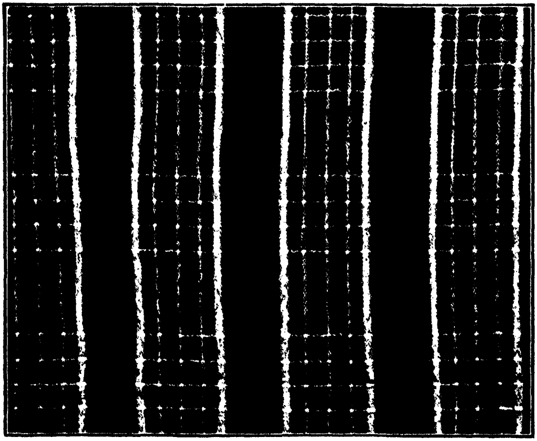
Single and Two-fold Yarn. In a third method of admixture the threads are compound. A strand of single yarn of one material is twisted round a thread of different material. The simplest form of yarn is a single twist of fibres which, upon unrolling, resolves itself into free material. There are two strands of single yarn in a two-fold thread, and, upon unrolling, the thread divides into two components needing to be separately untwisted before they can be reduced to fibre again. Generally, two-fold yarn is stronger than single of the same fineness, and its cost is higher because it has initially to be spun twice, as far as single yarn of the same number, and then to be doubled. Other things equal, cloths from two-fold yarn are worth more money.



(*Messrs. Evans & Weale, Ltd.*)

IN IMITATION OF KNITTING

Woven in cotton and artificial silk with chenille overchecks



(*Messrs. S. W. Whaley & Son, Ltd.*)

LIGHT DRESS MATERIAL

Cotton with a pattern in crêpe artificial silk twist

It is necessary for ease of weaving to employ two-fold instead of single warp yarns when dealing with some materials and textures. Two-fold threads are ordinarily stronger than singles of the same kind and number, but they are somewhat less pliable—a fact which may interfere with the gracefulness with which the cloth drapes into folds when made into flowing garments—and less full and spongy to the touch. A combination of two-fold warp and single weft is usual, the one to lend strength, and the other softness to the fabric. Fabrics are made with two-fold or three-fold threads in both directions, and these are ordinarily hard-wearing. In weaving webbing for military accoutrements even fifteen-fold two-fold cotton has been used. The components of a folded thread are not necessarily identical in size, colour or material. In the so-called grandrelle twist, where one strand is one colour and its fellow another, identification of the two threads is easy, as the one colour forms a spiral round the other. Such goods as fancy cotton sponge cloth owe their characteristic surface to the employment of deliberately irregular yarns, made by twisting together components of unequal sizes.

CHAPTER V

DESCRIPTIONS AND MISDESCRIPTIONS

In certain conditions it is an offence at law to apply misleading descriptions to fabrics. Proceedings are taken ordinarily under the Merchandise Marks Acts, which afford a clear definition of a punishably false trade description. Within the meaning of the Act a "trade description" is any description, statement or indication as to—

Quantity or measure ;
The place or country of production ;
The mode of manufacturing or producing ;
The composition of the goods ;
Patents, privilege or copyright ; and

"The use of any figure, word or mark which, according to the custom of the trade, is commonly taken to be an indication of any of the above matters."

"A false trade" description in the same purview is one which is false in a material respect.

The Custom of the Trade. With one exception all these points can be verified with fair certitude. The shadowy element is that of the custom of the trade, a matter which has often been found difficult of ascertainment and has frequently been thought to sanction the use of more or less misleading names. It is not easy to establish existing custom beyond a doubt, and it is not essentially a less difficult task to prove general custom at a time long past. But to settle many of the questions which might be raised it would be necessary to go back to the trade custom existing in 1887. The necessity is made plain by the Sect. 18 which reads : " Where, at the passing of this Act, the trade description is lawfully and generally applied to goods of a particular class, or manufactured by a particular method . . . , the provisions of this Act with respect to false trade descriptions shall not apply."

It was chiefly because a London magistrate was satisfied that "flannelette" was in use as a trade description for cotton cloths before the year 1887, that this name received a legal standing. Because it was not sufficiently proved that the name "Witney" had been lawfully and generally applied to blankets manufactured elsewhere than in that Oxfordshire town, the name can now safely be employed only in its strict geographical sense.

The Merchandise Marks Acts have oftenest been set in motion for the purpose of protecting collective trade names by associations of interested traders. Silk and linen manufacturers, as members of branches of industry peculiarly exposed to the competition of imitation articles, have been conspicuously active in suppressing false statements as to the composition of goods. District organizations have in some cases successfully defended the local monopoly of geographical names, like Witney blanket or Harris tweed. The assistance of the Board of Trade and the public funds can in some circumstances be claimed in instituting prosecutions, and this official aid has frequently been sought.

Trade custom has been defined by the Courts in a few instances, but in very few relatively to the large number of common names in general use. It has been shown that, although mixed wool cloth, when manufactured in a particular manner, may properly be called "woollen," it must not be sold as "all wool" or "pure wool." It is unlawful to call goods indigo-dyed when in fact no indigo is present; or to describe mixed linen cloth as

" linen," " pure linen " or " real Irish linen "; or to apply the word " silk " to goods not containing silk.

An element of risk is involved in giving any indication as to the origin, manufacture or composition of goods other than such as could be fully proved in case of need. Trade custom may be found to condone a departure from literal accuracy; or may not, for even the fact that a custom has been accepted in one action is not to say that the decision will never be reversed. Custom is a fluctuating quantity, changing with time and differing in the several districts or sections of the same trade. Customs arise and may continue without ever being seriously challenged, but their validity as excuses depends ultimately upon the test at law.

The custom of applying names, which by some standards are misleading, is of comparatively small consequence in dealings between persons who are not misled by them. Very many descriptions of dubious accuracy are current in the manufacturing and wholesale branches of the cloth trade, but prosecutions upon that account are at least uncommon. It is the use of false trade descriptions in direct dealings with the public that is most seriously regarded, and prosecutions under this section of the Merchandise Marks Act have been directed chiefly against retail dealers.

In order to protect themselves against the vagaries of unknown or ill-defined customs, associations of retailers have sought to crystallize the meaning of the terms most commonly met. They have passed resolutions declaring it customary to attach particular meanings to specified terms. Lists of definitions have been circulated, and the assent of manufacturers and others has been obtained to them. In some events, such evidence as to commonly accepted meanings might become important at law, and in any case agreements which serve as a shield against prosecution are useful to traders.

Origins of Fabrics. Names are indispensable if only to give an approximate idea of the character of the cloth implied, and district names are not invariably employed in the most literal sense. The habit of naming cloths after their source of origin is, of course, one of the most ancient of all. " Muslin " from Mosul, " cambric " from Cambrai," " damask " from Damascus, are types of name which have lost their original denotation. " Serge de Berry " is certainly French no longer, and the name " denim," now oftenest given to strong cotton cloth for workmen's overalls, is the modern form of seventeenth century Serge de Nîmes. There are other names which have lost their association with a given locality as thoroughly as " Brussels carpet " its connection with Belgium, or " Axminster carpet " with Devon.

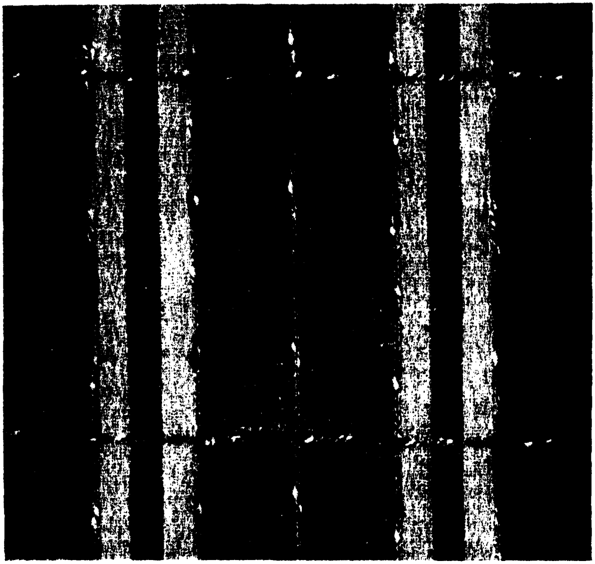
The early records of cloth-making in this country show everywhere a groupage of cloths according to their origin. Plain cloths made in Somerset, Dorset, Bristol, and Gloucester are mentioned together in a statute of 1389 ; Guildford cloths in 1391 ; Kendal cloths in 1407 ; and cloths from the Hundreds of Lyston, Tavistock, and Rowburgh (Somerset) in 1464. There is everything to show that in certain essentials cloths produced in one district were alike, and that the most compendious way of describing them was by their origin. It can be seen that a resemblance was inevitable in times when scarcely any but locally grown raw material was used, and all manufacturing appliances were of the simplest.

Although manufacturers have the whole world to draw on for materials, and a thousand opportunities of diversifying their cloths, it is still broadly true that the cloths produced in any one manufacturing district betray a family resemblance at some point. Manufacture is localized in most countries, the requirements of markets are more or less standardized, and the capacities of a given class of raw material and its conversion by the most direct means into cloth, assist a general similarity in the products of a given area.

Fairly definite meanings, sufficient to distinguish the salient character of cloth, are still lent by district names. "Manchester goods," applied generically to all the cottons made near or marketed in Manchester, is almost too comprehensive for enlightenment. "Bolton cloth," as descriptive of plain fabrics made from brownish Egyptian cotton, is a designation not unknown to the general public. Burnley, by its close association with cloth intended for calico printing, Oldham and its cotton velvets, Blackburn and its fine fancy cottons, Preston and its superior plain and fancy cottons, Wigan and Stockport and their heavy twills, are all districts which have acquired distinctive reputations, as have Nelson and Colne for cotton poplin and linings, to say little of the celebrated Scotch ginghams and other cottons. To cite the name of any one district is to summon up in informed minds a sufficiently clear idea of the type of cloth indicated.

Belfast and the North of Ireland are associated with linens clearly distinguishable from the heavier sorts characteristic of the East of Scotland, or the drills produced in Barnsley.

"Bradford goods" implied at one time light worsted stuffs and linings, whereas it means at this time rather gabardine and serges and fancy worsted suitings, probably of a less expensive type than the fine worsteds typical of Huddersfield, the South of Scotland, or the West of England. "Colne Valley" tweeds, within the original meaning of the term, are certainly the produce of the Colne Valley environs of Huddersfield, although cloths indistinguishable from them are produced, for



By courtesy of *The British Textile Syndicate, Ltd.*

MODERN FANCY COTTON FABRICS COMBINE FREQUENTLY A SERIES OF DISTINCTIVE FEATURES

The groundwork is of a crêpe-like surface. The check is produced by the use of coloured twist yarns with a recurrent slub at close intervals. Additional character is lent by the coloured stripes

example, in Batley, where heavy wool velours and mantle cloths are more largely made. The West of England and the border counties of Scotland have acquired outstanding reputation as the outcome of past efforts.

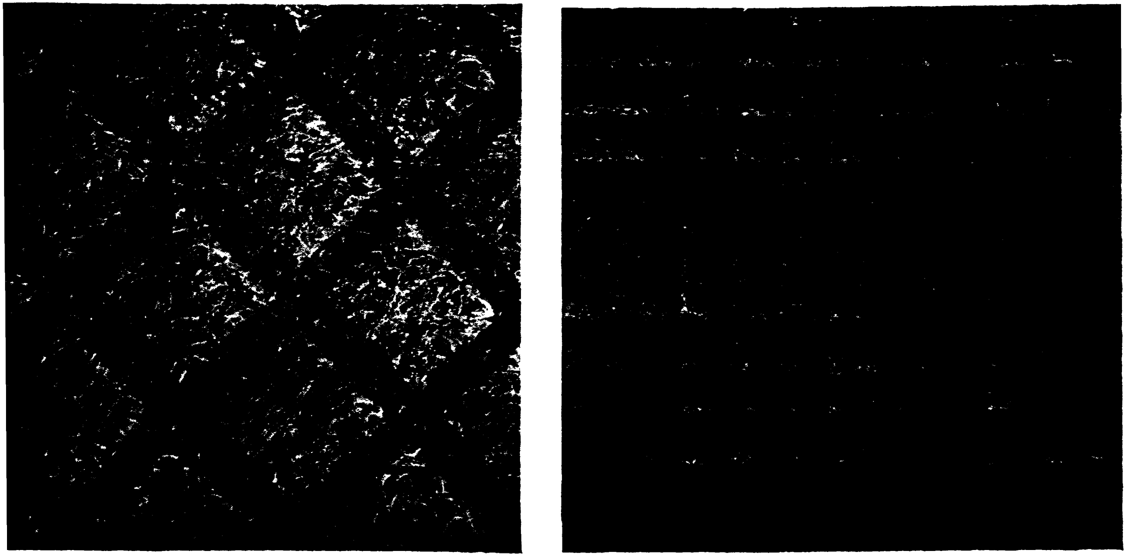
The style and character of cloth is sometimes more shortly and conveniently summed up by reference to its district of origin than by any other means: "Japanese silk," for example, or "Scotch tweed" is almost completely informative. Conceivably a Burnley manufacturer might agree to the proposition that "Burnley goods" implies not so much cloths made within the strict boundaries of his district as fabrics having the Burnley characteristics; and might add that his own goods, although manufactured in Burnley, were rather of a Blackburn type. It is not, however, conceivable that an Irish linen, Scottish or West of England woollen manufacturer should agree that goods not of Irish, Scottish or West of England origin could legitimately be sold under those names; and they could unquestionably find many to agree with them.

Deservedly or not, certain district reputations stand higher than others, and so long as this is true the temptation to attach the higher-sounding names must remain. That geographical names are capable of more than a geographical connotation is clear from the way that many of them have survived the local industry. Spitalfields silks are still met with, although the district manufacture has gone, and it is at least arguable that the name has acquired a secondary meaning, and by custom refers as definitely to a particular type of English silk as it did in times past.

Common Names. For sufficient reason, the general disposition of the trade is certainly to use names loosely. No universal practice governs even such descriptions as "plains" and "fancies," which is perhaps the commonest way in which cloths are classified according to their feature. Upon a pedantic interpretation no goods are strictly plain unless woven with a plain (i.e. not a twill) weave, but plain surfaces are produced by other than plain weaves, and common twills are so little ornate in character that they are freely included by most people in the category of plains. Upon another reckoning all goods are plain, if plain or self-coloured, as distinct from patterns in two colours or more; but not if dyed in other than the most ordinary colours. It is so impossible to decide where the one class ends, and the other begins, that the introduction of the word "semi-plain," to describe cloths of a slightly fancy character, is not to be wondered at.

The difficulty is not much less in respect of particular kinds of cloth. A plain-woven, white cotton may be properly described as calico, cambric, madapollam, long-cloth, lawn, jacconet, nainsook, batiste, mull, and other names according to its construction and finish. The correct term for a particular sample may be as debatable as the exact point at which drill tails off into drillettes or jeans into jeanettes.

One and the same kind of cloth is known under different names even at one time and place, and at other times and places by such names as unknown persons like to apply to it. There are fashions which lead to the supersession of an old name by new ones, and to the revival of old terms to describe new articles. The most striking of modern instances may be the resuscitation of the name "gabardine," first to describe a hemp fabric for rainproofs, next a cotton cloth, and after that a worsted cloth, also for rainproofs. Without definitely losing its association with raincoats, gabardine has come principally to suggest a wool cloth which has for some years been the most popular worsted material used for women's dresses; and used in heavier cloth also for men's suits. With so varied a career behind it, the future mutations of meaning cannot be foreseen, although in due time the name will no doubt be succeeded by some other favourite.



courtesy of *Messrs. Wm. Whiteley & Sons. Ltd.*

CLOTH DESIGNS PRODUCED, NOT BY WEAVING OR EMBOSSING, BUT BY CUTTING THE SURFACE OF PLAIN WOOLLEN CLOTH

The least questionable names are those anchored most firmly to a definite and verifiable feature ; words like check, stripe, repp, twill, herring-bone, descriptive of the pattern or design. It is impossible in practice to prevent outsiders from attaching new meanings to old terms, or from assuming that a name descriptive of a weave is descriptive also of a composition. Thus "hopsack" is not another name for wool but for a basket-like texture, nor is "armure" or "broché" a synonym for silk. There was a time, doubtless, when all cambrics were linen and most crêpes silk, but by the legitimate development of manufacture other materials were employed to make them. Serges and venetians are to be had in wool, silk or cotton at will, and, if there are any cloths remaining which have not yet been made in a cheaper material than originally, it is a safe prophecy that they will be, and that the original name will be transferred more or less bodily to them unless special measures are taken to prevent the transition.

Growth and decay are always at work among the common names used to describe types of cloth. New styles of cloth do not necessarily come into the world bearing the name by which they ultimately become best known. Experiment begins with no better than a vague idea of the point to which it will eventually lead. The original cloth dies for lack of sufficient support and is succeeded by modified forms, which inherit its title, so that the meaning to be read into names necessarily varies with time and place.

CHAPTER VI

THE CLOTH MARKET

ARRANGEMENTS for the sale and distribution of cloths are ordinarily made before bulk manufacture begins. The manufacturer is upon safer ground in working to orders than in making to stock, and he endeavours to produce samples and quote prices which enable orders to be booked. With definite orders in hand he is free to contract for his own supplies of yarn or raw material, although the exigencies of the market require him many times to make these purchases first. Timely buying is of the first importance in fluctuating markets, and very often it is in skilful buying rather than in the work of manufacturing that the producer's profit is made.

Firm orders to deliver cloths in specified quantities at appointed dates and prices and upon stated conditions as to payment, are indispensable to a healthy state of trade. Manufacturers have other uses for their funds than the carrying of large stocks of manufactured cloth, and, when the unsold quantities become excessive, instability of values sets in. The producer, hard pressed to reduce his obligation to the bank, is tempted to accept offers below the market price of the day. In the expectation of further falls new buying is delayed, and a situation arises as prejudicial to manufacturers' customers as to themselves. This situation is as capable of being created by the cancellation of orders already given as by the deliberate laying down of large stocks, and its dangers cause manufacturers to take a serious view as to the observance of contracts.

Cloth cannot always be sold in advance in sufficient quantity, and, rather than stop too many machines and see their workpeople drift away, manufacturers take the risk of producing limited quantities on speculation. The risk is oftenest undertaken in respect of standard cloths, such as are reasonably sure of an ultimate market, at a price chiefly determined by the cost of labour and materials. It cannot be undertaken in relation to fancy cloths exposed to the caprices of fashion, and liable to heavy depreciation from that cause. Working to stock is resorted to in order to provide steadiness of employment, and to avoid awkward alternations of overwork and underwork.

Market Price. In a healthy state of trade, almost the whole work is done to order, and preparations are made sufficiently far in advance to enable manufacture to go on smoothly. Confidence prevails in value, deliveries are accepted without quibble, and the casual lots available immediately at attractive prices are looked on as a boon. To produce that condition it is usually necessary not only that demand for manufactures should be active, but that the raw material markets should be steady or rising, provoking no fear that prices will have fallen considerably before the goods have been consumed.

This state does not continually prevail, and, in order that it may come into being at all, it is incumbent upon the several parties to the trade to divide the risks of the trade equitably. The manufacturer looks to the importer of raw materials to take his share of risk in buying and storing supplies for the use of the industry, and to his own customers to take their share by ordering in advance of their immediate needs the manufactured cloths which will be needed for their requirements. Raw material requires lengthy preparation to make it ready for manufacture into cloth. Cloth has to undergo treatment after being woven, which often involves waits of weeks or months. Between the time that raw material is landed in the country and that at which the cloth made from it passes to the ultimate consumer, there is a time lag of hardly ever less than three months, often of twelve months, and not seldom of fifteen months or more.

Values have time to change seriously in the meantime, and this change is negotiated by a process of averaging the prices of successive purchases. The holder of dear raw material buys more at lower prices to bring his average cost down. The buyers of yarn for cloth-making place contracts for yarn at favourable opportunities for piecemeal delivery at future dates. The contract prices are averaged in arriving at the cost of fabric, and so the fluctuations are smoothed out. In steadily falling markets the change is necessarily downwards and in rising markets upwards, but at any one time the effective cost of the material in current use is probably something different from the price of the day.

Cloths may advance or fall in price for other reasons than the market changes in the value of its raw material, for the cost of material is only one component, accounting perhaps for 30 to 60 per cent of the total. Manufacturing is a business to itself, and the market value of manufacturing facilities stands sometimes at a premium, sometimes at a discount. In the one case cloth may rise because of the demand for that article regardless of the movement of the material market, but changes in the values of raw materials are publicly recorded. Buyers are guided by the market reports, and are loth to follow cloth upwards at a time when current transactions show raw material to be moving downwards. Movements of cloth prices opposite to the trend of the raw material market comparatively seldom occur, but the sale of cloth is very often prejudiced by falls which have no relation to the cost of the material in hand. Cloth buyers are apprehensive of new changes, and more inclined to overestimate than to underrate their effect upon the value of cloth.

Changes in the rates of manufacturing wages affect the cost of manufacture, although they bear only upon one constituent. The changes are gradual and seldom higher than 10 per cent in any one step. The costs of fuel, transport, dyes, soap, oil, leather, and consumable store in general all enter into the case, and, if their individual importance is slight, their collective weight is appreciable. The effect is not immediate for the reason that these movements also are averaged.

The changes are not all directly experienced. Important parts of the work of producing cloth are given out to be performed at a stated charge by others. Bleaching, dyeing, printing, and finishing are mainly in the hands of specialist concerns working for the trade, and combination and price-fixing are rife among them. The large combines seek to equalize their charges, and either a rise or a fall in their working costs is delayed more or less and is then felt in the form of a general increase or reduction.

In periods of prolonged depression manufacturers of all classes find their profit margins reduced. Unable to recover from their customers the full advance which they have themselves been obliged to pay, they find themselves confronted with new falls in material. Customers hang back in the expectation of a broadly equivalent fall in cloth, but, part of that fall being necessary to restore profits to a working level, prices do not immediately respond. In the opposite event of a rise, weeks or months pass before the change becomes effective, and the advance ordinarily comes about by averaging dear purchases with the cheaper ones made beforehand. The effect is naturally quickest in the most active markets, in which large quantities change hands at fractional prices. Grey cottons will vary in price by a penny or two to the piece, whereas in the more costly kinds of wool cloth an advance or reduction of less than 3d. a yard is barely known.

Day-to-day or even hour-to-hour changes occur in the raw material markets and are reflected, for instance, in day-to-day changes in yarn or grey cloth quotations upon the Manchester Exchange. But, in the more highly manufactured forms of cotton cloth, the element of raw material constitutes a smaller proportion of the total cost. Cloth and fibre are further apart in point of time, and in addition the system of seasonal buying has to be reckoned with. Most cloth is made and bought for a definite season, and its price is more or less definitely fixed for that season, change being delayed until another buying season comes round.

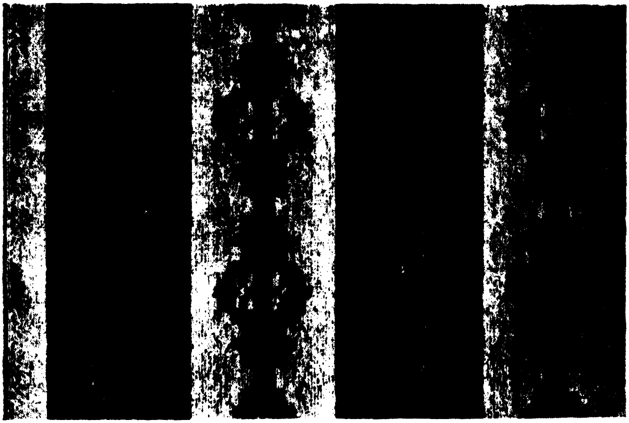
The Merchant System. The manufacturer, obliged by the exigencies of manufacturing processes to demand orders of a certain minimum size in order to quote a practicable cost, looks to those who can give him business upon that scale and meet their accounts at sufficiently short credit. Those best able to give out " making quantities " are wholesale merchants, export merchants, large manufacturers of apparel, and certain of the largest retail dealers. The chief customers belong to four classes—

Merchant houses, whose position approximates to that of a manufacturing concern, which buy cloth to stock or to order in one condition and sell it by wholesale in a more fully manufactured form, employing bleachers, dyers, printers or finishers to work the processes.

Merchants who buy cloth fully finished and sell it in more or less large quantities to retail dealers, tailors or small trade consumers.

Shipping merchants who for the most part do not buy to stock but against orders received from abroad, and finance export transactions.

"Makers-up" of apparel, including the wholesale clothiers, mantle and costume makers, shirt, blouse, and overalls, umbrella manufacturers and the like.



(Messrs. Lister & Co., Ltd.

STRIPED MOQUETTE ; MOHAIR VELVET WOVEN IN A COLOURED PATTERN FOR UPHOLSTERY

By courtesy of " The Furnishing Trades Organiser "

Although dealings of every variety take place, the trade divisions are maintained with some rigidity and have the sanctions of long custom and convenience. The manufacturer who can dispose of his output for quick payment in an unfinished state is the sooner able to turn to another transaction, and works naturally at lower expense although not necessarily at less net profit. The merchant " convertors," to use an American name for them, exist principally in the textile manufacturing districts, proximity to the mills and finishing works being a virtual necessity of their business. They have in some instances weaving mills of their own, so combining merchanting with manufacturing; or financial interests in particular mills; or simply a position as preferential customers arising from the fact that they supply given mills continuously with almost full work.

Their largest transactions are in cloths of certain standard qualities, and, by taking advantage of the markets and maintaining adequate stocks, they are able frequently to underquote the manufacturing price of the day. Their capacious warehouses and considerable capitals afford facilities which manufacturers would otherwise have to supply for themselves. They help to meet the market not only in price, and by the provision of ready stocks, but by introducing new styles of colour, design, and finish, and the fact that they delegate the execution of the work to others leaves them still in much the same position as manufacturers. They employ their own trade marks, and, in many instances, offer specialities not procurable from other quarters. Ordinarily, they work at a low ratio of expense, although this necessarily bears a relation to the quantities in which they resell and the risks that they accept. Manufacturers wishing to dispose of their production in the grey, unfinished state have in practice to confine their sales to merchants of this class, or to shipping houses occupying the same position relatively toward the export trade.

The manufacturer who markets his goods fully finished has a wider choice of customers, should he choose to avail himself of that opportunity, although in point of fact he does not always see fit to do so. Manufacturers with connections among a given circle of merchant houses find it most to their advantage to confine their dealings to that class. In this way a Lancashire cotton manufacturer, for instance, will confine his own sales to a circle of Manchester merchants, leaving them to deal with the London or other markets. A Yorkshire woollen manufacturer will confine his dealings to merchants in particular centres to avoid " going behind his customer's back." Special spheres of influence have been delimited, and customers within them mark their displeasure with those who omit to observe the boundaries. These limitations are sectional, arising out of the course of individual relations, and do not preclude manufacturers from choosing the channels dictated by their self-interest. Machines clamour for work, and the manufacturer perforce seeks out those who will give it in sufficient quantities and upon reasonably satisfactory terms.

From the point of view of the manufacturer, the effective difference between merchants consists not so much in their location as in the quantities which they can or will order at one time, and in the promptitude of their payments. Both considerations are affected by the conditions in which merchants resell, and these determine the expense ratios at which merchants work. Merchants in buying to stock in advance of the season court the risk of finding more or less large remainders left upon hand to be sold at reduced prices later. If they have to maintain a large staff of travellers to break deliveries up into small parcels, and accord long credits with the accompanying risk of bad debts, their position is different from those who sell in large bulk and upon short terms, and work only in part from their own stocks. In the one case the merchant will be better remunerated with 10 per cent profit than the other with 20 per cent. Merchant houses of both types exist, but they sell in general to separate classes of customers ; one selling whole pieces or several pieces at one time, the other selling cut lengths of cloth and facing an infinitude of detail. They exist both in the home and the export trades, and the average size of their transactions is a matter apart from the magnitude of the business of the house. Obviously, a large business may be built either upon a multiplicity of small orders or upon a lower number of larger ones.

The merchant dealing in large quantities at one time presents a flank vulnerable to the direct competition of manufacturers. The merchant dealing in smaller quantities at a higher rate of expense fulfils a purpose highly useful to those who want small assortments of an extensive variety of goods, but he is at some disadvantage in dealing with those who can buy in large bulk. The aggrandisement of the retail stores has brought into existence retail buyers able to place orders of important size, and direct dealings take place between them and manufacturers or merchant houses handling cloth in large quantities.

The Shipping House. The same differences of position subsist in the export trade, where they are even more marked. Export merchant houses are of all grades, between those which buy cloth for shipment eighteen months hence to China, there to be sold by auction at the risk of the merchant, and those which satisfy the wants of one or a small group of retail drapers abroad. The typical shipping merchant buys not to stock but upon indent, and deals with principals abroad who place orders of considerable size. He assumes the full responsibility of the transactions, and is remunerated either by such profit as he can make under competitive conditions, or by a low rate of commission payable by the overseas customer. With the aid of the banks he finances the transaction, giving the manufacturer money for the goods promptly, seeing to the complicated routine of packing and shipment, and receiving his payment in turn, usually upon delivery of the documents to bankers at home or abroad.

The shipping merchant books orders usually upon patterns sent out from this country to his agents and offices abroad, or taken out by his commercial travellers. It is his business to know the tastes and preferences of his market as much as the standing and morality of his foreign customers. The competent shipper is not misled, as beginners often are, into supposing that conditions abroad are so much the same as at home that precautions which suffice in the one case are enough also in the other.

The export markets are subjects of specialization on the one hand by classes of goods, and on the other by geographical situation, and shipping merchants confine themselves usually to cloths of certain classes and to specific markets.

So specialized is the business that there is work frequently for two classes of merchant house—one in Manchester, Bradford or elsewhere in the centre of textile production, and another in London, Paris, Hamburg, or other continental centre ; the one attending chiefly to the technique of buying, inspecting, and packing, the other mainly to the financial routine.

In the home trade, retail dealers avail themselves of the financial facilities of the large merchant houses, sometimes by way of counting house loans of definite amount at a stated rate of interest. They thus become " tied houses " to the extent of the main part of their purchases, with liberty of course to make the best bargains possible with the heads of the warehouse department. The shipping trade has its tied houses also, consisting of import houses abroad financed by the merchant at home, or of exporting houses in this country confined in their dealings to given importing houses abroad. A less definite tie is imposed by the system of current accounts, in which financially strong British export merchants honour all orders received from a given overseas customer up to an agreed total. The arrangement is commonest in dealings with markets subject to erratic movements of exchange. Remittances are made as exchange favours, interest is charged upon periodical balances, and accordingly as the account is in credit or debit.

Exportation is not solely in the hands of merchants, for some textile manufacturers are represented by agents abroad, although chiefly in the colonial markets. The merchant has the advantage of presenting to his customer the products not of one but of an indefinitely large number of mills, and thus of spreading his expenses over a large turnover.

Manufacturers' Agents. The system of representation by local agents paid by a commission upon the turnover, although not universal, runs through all departments of the trade. In the simplest circumstances the manufacturer is his own salesman, disposing of his output locally upon the exchange or by visits to the warehouses. The larger the local market, however, the more desirable is assistance; and, in the largest of all in this country, the services of grey cloth agents, acting for all comers, are employed to make sales upon the Manchester Exchange. At a greater distance from the mill the chance of making sales depends either upon representation by traveller or by resident agent, and a combination of both is not unusual; the agent being relied upon for day-to-day work and the making of appointments with buyers, and the traveller or principal working with him to reinforce his efforts.

Cloth manufacturers' agents are a numerous company in all the centres of this country in which cloth is sold wholesale, and ordinarily they hold commissions from several manufacturers producing cloths of different kinds saleable to broadly the same customers. The system is exposed to the usual objection that the agent has an interest in the sale without participation in the risk of account, which risk is in some instances considerable. *Del credere* arrangements are sometimes effected, whereby the agent, in return for a higher rate of commission, guarantees eventual payment. Again, it is said that in case of dispute with a customer the agent tends to take the customer's side rather than that of his own principal.

The agency of a few good manufacturers affords a substantial income to an energetic man, and agencies are greatly sought. They are held often by persons who have occupied positions as buyers, and are thus able to appreciate well the points which commend goods to the market. To be well-introduced to buyers, to possess the entrée to the warehouses, and to be able to influence a large turnover is the best passport to a good agency. The services of the most successful agents are always in considerable demand, and such men are able to exact terms specially favourable to themselves. Payment is by commission, but minimum guarantees are not unknown ; contributions are made by the principal to office and travelling expenses in some instances, and necessary expenditure upon postages, carriage, and telegrams is reimbursed. Rates of commission vary in accordance with the circumstances, and range ordinarily from 1¼ to 2½ per cent.

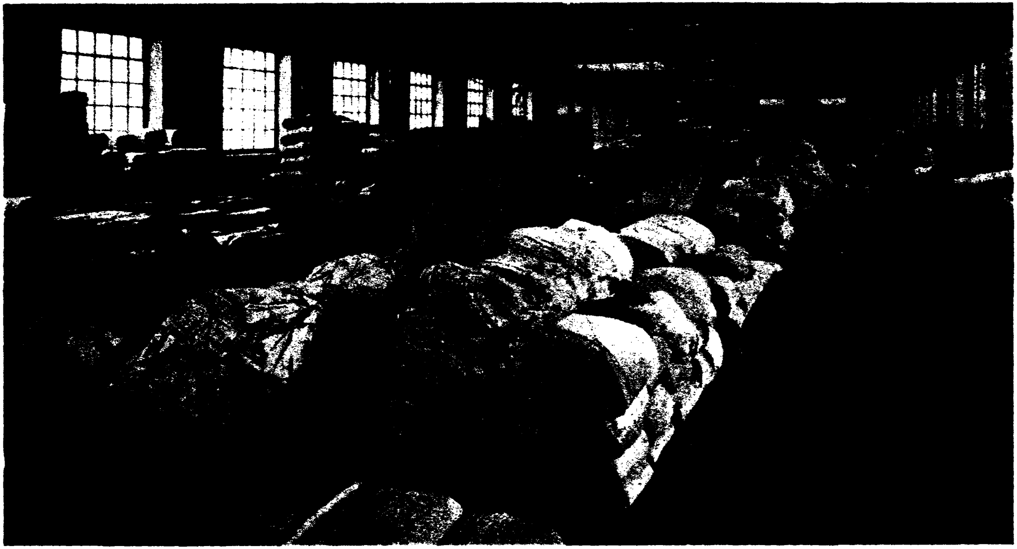
CHAPTER VII

THE CLOTH WAREHOUSE

THE main functions of the cloth warehouse fall under four heads. Its first purpose is to act as a receiving department to which goods come by certain routes, in certain forms, and at certain hours. Its ultimate business is to act as a dispatching department from which the same goods pass after a certain length of time to the next customer. Between while the warehouse serves in other capacities, regularly as a storage department and frequently as a manipulative department. According to the condition of the case, other departments may be present—a counting house in which the bulk of the office work is done, a showroom for the exhibition and sale of goods, and a pattern room in which samples are cut, numbered, and prepared.

Warehouses are not all of one pattern, and the organization proper to those which are little more than cloth-receiving rooms attached to the mill in which the cloths are produced, differs in important respects from the merchant's warehouse. A difference is natural between warehouses in which blocks of goods are sent out in much the same bulk as they arrive, and those from which deliveries are made in comparatively small parcels. The differences call for corresponding changes of system.

The Receiving Department. Merchants' warehouses in the textile manufacturing districts receive more or less of their deliveries by road vehicles. The pieces are brought in loose from the mills or finishing works and are placed by the carrier into convenient piles upon



By courtesy of *Messrs. Horrockses, Crewdson & Co. Ltd.*

A MILL WAREHOUSE WITH MEASURING MACHINES

The machines convert the plaited cloth seen in the foreground into the rolled bolts shown in piles upon the left the warehouse floor, or preferably into wheeled warehouse trucks for conveyance to the most convenient point. There is little to do to them immediately beyond verifying the gross quantity and tallying it with the delivery note. A signature is always given by the recipient, and, if the goods arrive palpably wet or damaged, a note is made to that effect upon the receipt.

Cloth sent by rail arrives usually in packages which hold the bulk together and serve as some protection against the accidents of travel. Single pieces come in paper parcels, and larger quantities usually in canvas, wooden cases, or, more exceptionally, in hooped bales, and these packages, when they have been duly signed for and placed aside, are left to be opened later. It is not the invariable practice to maintain an inwards delivery book, although it may be advantageous to do so and thus to preserve a complete record of arrivals, together with the exact hour of receipt and the name of the person responsible for receiving them. Goods arrive in some instances before notice has been received of their dispatch, and it is not always possible to say, without opening the packages, precisely from which source consignments have come. The sender's name does not necessarily appear upon the label. The delivery sheet presented by the railway carter supplies only the name of the sending station, and this may be used in common by a variety of supplying firms. It is not practicable to turn back all unexplained consignments, and equally it is not possible, without opening the goods, to give full details about them in an inwards delivery book. It may be advisable to turn back immediately goods known to have been sent in defiance of order, leaving them to be taken away again by the deliverer. But the initial work of the receiving department is formal, and is by no means equivalent to taking the material to account.

The general disposition of warehouse managers is to cut formalities down to a minimum, and to avoid the creation of records which are not positively indispensable to the work. An inwards delivery book, if carefully maintained, has its uses as a permanent record. It can in case of need be elaborated into a system for advising the respective departments immediately, or at stated intervals, of the arrival of goods necessary to them. A shorter and more usual course is for the departments to advise the receiving room of their own urgencies. An inwards delivery book not carefully and thoroughly maintained is worse than nothing, and a system of inter-departmental book-keeping, to show the transfer of goods from the receiving to some other department, is not commonly required. If goods of which advice has been received are not to hand, it is for the department concerned to pursue inquiries. Conversely, if goods taken into the receiving department are not cleared in a certain length of time, it is for those responsible for that room to institute inquiries in the departments for which they are probably intended.

Even in many large warehouses the receiving and dispatching departments are one, using the same doorway and manned by the same staff. On the score of economy of room and labour the arrangement has much to commend it, although in warehouse work there is always something to be said against methods which facilitate theft. Not every warehouse has, or can be given, separate doors for delivery and for dispatch. In a majority of instances outgoing and incoming goods have to pass through the same doorway, generally that of the packing department.

Although in one sort of warehouse cloth is received once and dispatched once, this simplicity is not universal. There are warehouses which, in the ordinary course of events, receive their goods not in a finished but in some semi-finished form. The cloth arrives " grey " from the mills and, after being examined more or less thoroughly, is sent out again to the bleaching, dyeing, printing, or finishing works to return again in an advanced condition, and then to be taken into stock or dispatched against order to the customer. In these circumstances, parts of the work which would otherwise fall to be performed in the warehouse—e.g. in the measuring and making-up of the cloth—are transferred to the finishing works.

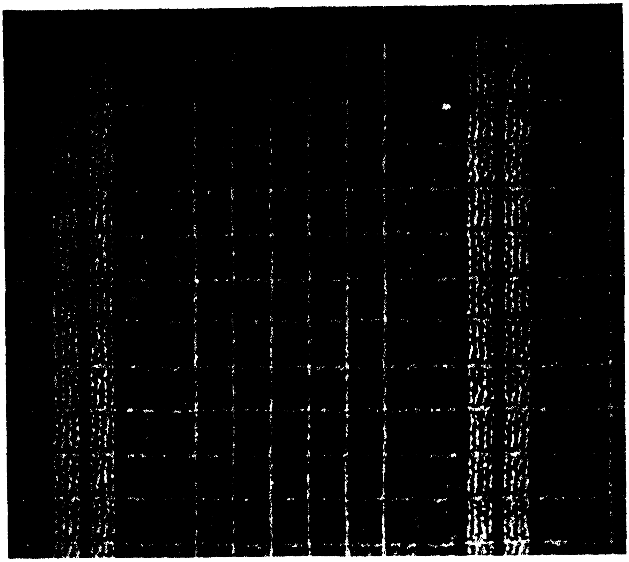
Again, in centres like Manchester, where large packing houses exist, the normal work of the merchant's warehouse devolves upon the commission maker-up and packer, acting upon the customer's behalf at a fixed tariff of prices.

Cloth Examining. Cloth is not taken definitely into stock until it has been examined, and for this purpose a good light is required. The goods are wheeled away from the receiving room, preferably to a room with north lighting, and a counter of convenient height immediately facing the windows. The preliminary work of passing the delivery is a responsible duty generally undertaken by the managing head. The delivery is compared upon the table with the sale patterns upon which the order was given. The shade, design, and finish are carefully scrutinized. The strength is tested in case of need by finger test, the weight by the yard or the piece is noted, and the delivery is either accepted or rejected. In the former event, the goods go forward to what has been called the manipulative department, and in the latter they are returned to their source, the reason of rejection being assigned.

Woollen and worsted cloths in especial are bought often in accordance with a specification of the weight by yard, e.g. 17–18 oz., implying the running yard of the specified width. It is of convenience to hang near the scale upon which the cloth is weighed a printed ready reckoner table, so arranged that the weight by yard for any customary width may be read at a glance; the length and weight of the piece being given.

This preliminary passing of the piece as suitable in general respects does not preclude its refusal at a later stage. The work of passing can best be done in the same room as that in which the cloth is to be looked over, measured, ticketed and papered, and this is known customarily as the making-up department. The amount of care expended in looking over cloth depends upon the standard of perfection required, and somewhat also upon the conditions of the purchase. Where the work is done thoroughly, and especially in relation to the more expensive cloths, every piece is looked through individually and with care. In the cheapest articles, and particularly in those of known uniformity of quality, it may serve to go carefully through a few specimen pieces taken indiscriminately from the bulk.

Pieces which arrive rolled around boards have necessarily to be unrolled before they can be examined, and double-width goods which arrive folded, face to face, have to be opened out to full width for examination. The heavier and the more expensive classes of cloth can best be examined with the help of the "perch," as customarily used for examining high class wool goods. This is a frame of overhead rollers over which the cloth is drawn. Two or three men preferably assist in the process, two standing in front of the cloth, their backs to the north light, whose business is to draw the cloth downwards while keeping a vigilant eye for defects in the fabric. The third man, standing behind and opening the cloth out upon its upward passage to the overhead rollers, watches for minute holes or other defects not readily apparent from the front.



By courtesy of *The British Textile Syndicate, Ltd.*

A FANCY COTTON FABRIC

Showing a crimped groundwork with checks and stripes formed of heavier and irregular cotton yarns in contrasting colours. An example of how demand for conflicting features is reconciled

Defects, such as oil stains, tears, broken threads, thick and thin places or bars of changed colour, are scrutinized. The passage of the cloth over the perch is stopped, and, if the damage is deemed serious enough to warrant a demand for an allowance, a short tag of string is tied to the edge, or list, of the piece. If very many small damages are found, or still more serious defects, it is the duty of the percher, who is ordinarily a warehouse foreman, to direct the attention of the managing head, and so cause either the rejection of the delivery at this point, or suspension of acceptance until the manufacturer, the dyer, or other responsible party can be consulted upon the subject.

Cloths of light weight or narrow width, delivered to the warehouse in plaits or folds, are not usually examined over the perch. They are looked over in their folds by an experienced man. The folds are thrown back in quick succession, one by one, under a strong daylight, and the defects detected in this way are treated in the same manner as those found when perching the cloth.

The strings attached to the list show the purchaser or garment cutter that a fault exists at that point, and enable him to cut his cloth accordingly. In many classes of goods an allowance is made of the value of one-quarter yard of cloth for a small damage, and sometimes of one-half yard for a " through " (i.e. for a cut extending from edge to edge). Occasional damage is unavoidable in the very complex routine of cloth manufacture, and forms no reasonable ground for objection in view of the rebate that is allowed for it. But many damages occurring at close intervals throughout the piece disqualify it totally in the worst instances, or render the piece marketable only as " job " goods or as " seconds " at a more or less heavily reduced price.

The necessity for thoroughness in examining cloths yard by yard varies with the amount of attention that the goods have received beforehand. Cloths which are packed off from the mills without minute scrutiny at the point of departure need more careful examination than those which have already received critical attention. Experience shows the amount of attention to vary, goods from some sources arriving in a state of regularity which almost dispenses with the need of examination; others arriving direct from their last processes with their remediable faults unremoved, and their imperfections not indicated by " manufacturers' strings."

The Making-up Department. It is necessary next to make up the cloths afresh. Wide cloths, requiring to be folded down the middle, have to be thrown into their fold again, and this work of " rigging " can be done either by hand or by machine. Machines are made which take cloth at full width, fold it over a pyramidal table, and thereafter either roll it around boards or lay it in regular flat " cuttles " or plaits, and at the same time measure it.

Cloth measure forms one of the most fertile and at the same time annoying causes of trade dispute, and there are two measures to be taken. The width is measured usually by a flat yard measure, and, in case of variation, is taken at more than one point. Cloth sellers protect themselves commonly against claims by specifying a maximum or minimum width, e.g. 27–28 in., 30–31 in., 56–58 in., and as to the actual measure of width dispute is relatively infrequent.

It is " shorts," or short-length measure, which provokes most dissension. Cloth of most kinds is in a degree elastic, and it is difficult to specify with exactitude the tension under which it should be put in measuring. Cloth pieces are of all yardages up to 100 or so, and the effects either of stretching or the reverse are cumulative. A small advantage taken in each unit of measure thus translates itself into a considerable deficit in the end.

The yardstick is used, of course, only for short lengths, and its use has been the subject of complaint for an indefinitely great number of years.

A more usual method of hand measurement is the measuring table, commonly of 5 yds. in length and marked with intermediate divisions. The ends of the table are furnished with wooden rollers to reduce friction in transit. The cloth to be measured is placed in folds upon a tray on the floor at the head of the table, and is drawn down and thrown into folds upon another tray at the foot by a youth bestriding this tray. The end of the piece having been drawn down the table under such tension as the warehouseman sees fit to apply, a chalk mark is made by the foreman measurer. The length is called out " five," and the cloth is drawn again until the mark is opposite the five-yard notch, when " ten " is called, and so on. The full length being ascertained, the foreman applies a brass stamp, wet with colour paste, to form a coloured mark at the end of the piece.

Lengths taken initially in yards are convertible easily into metres for markets in which metric measures are usual. The notation to use is at the option of the customer, and the cloth sold at prices quoted in English currency is customarily sold by the yard even to the metric countries, whereas cloth priced in foreign currency is not. Tables showing the metric equivalents of English measures form a part of the equipment of an export warehouse, and are published for the trade by firms of stationers.

As it is objectionable on practical grounds to bandy customers' names, or to mark goods plainly with the name of the customer for all to see, a system of order numbers is advisable. These numbers or combined letters and numbers can well be recorded in the order book, in which details of order received are entered. This code letter and number appearing upon correspondence, in the warehouse books or upon the piece tickets, serves to show for whom the goods are intended.

The moment of measuring makes the best time at which to cut off any required pattern length, and it is virtually indispensable in export warehouses to retain a reference pattern, if not of each piece, at any rate of each separate lot of pieces. The needs may be met by a strip three or four inches wide of the full width of the cloth, and cut from the head of the piece. It is advisable to attach to this pattern the manufacturer's original ticket.

The swing ticket, applied originally to the piece by the manufacturer or supplier, is attached to the reference strip by slitting and looping. The weight of the piece has already been noted on the ticket at the time of the initial passing, as have the lot number (or consecutive number), the order number, and the warehouse shade number. The warehouse measure of the width of the cloth is noted in the corner of the ticket. The yardage as stated by the manufacturer is struck through with indelible pencil, and the yardage as ascertained by the warehouse measurement is written in. The particulars as given upon these tickets form a complete record of the numbers, width, weight, and yardage, and, with the allowances for damages together with the strip of cloth with ticket attached, complete the identification.

A new swing ticket showing the lot number, order number, quality or shade number, yardage, and allowances for damages is attached to the piece, and the cloth, as soon as it has been put into a form more convenient for handling, is ready for the stock room. Two main methods of making-up cloths are followed. Rolling, in which the cloth is wrapped round a flat board or a roller; and plaiting, or cuttling, as the operation is called, in which cloth is laid in flat folds.

Rolled pieces have an advantage in their compactness and firmness, and in the absence of pleats caused by folding. Plaiting dispenses with the need for unrolling when the cloth is required, and is conceived to be better for the preservation of the finish in some instances. As the flat folds of plaited cloth need holding together to facilitate handling, it is usual to use the last two or three yards of cloth as a wrapper for the whole. A piece plaited in folds of about a yard wide is sometimes folded bodily to reduce the width and to improve the compactness, and is sometimes stitched with string through the lists.

Rolling can be performed by hand after a moderate amount of experience, and is then done at a table of convenient height by a warehouseman standing at the foot of the table. The cloth is wrapped neatly and under light and even tension round the board with its edges level ; and hand-rolling is to be preferred in dealing with very heavy cloths. Hand-rolling can be combined with the measurement of the length of the piece, and much can be said for a system that eliminates the five-yard table. By using a simple device it is possible to lay a paper measuring tape within the cloth in course of the rolling. The practical advantage is great, because it is of as much importance to prove the measure true as to make it true.

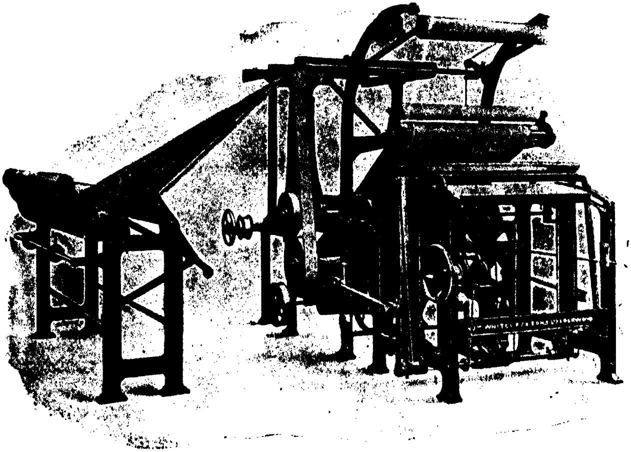
The device employed requires a table of some three of four yards in length, and a wooden or metal T-piece extending at right angles to the edge of the table. The T-piece has at its base a pair of pegs engaging with holes in the table top, and contains a chamber fitted with a metal lid in which a roll of printed paper tape is placed edgewise upon a central pin. The paper is light, tough, and about three-quarters of an inch in width, and printed with divisions of ¼, ½, ¾, and 1 yd. ; or in divisions of one metre. The yard or metre divisions are numbered from zero upwards, and the rolls are made of lengths corresponding to the normal lengths of the cloth pieces treated.

The end of the tape is led out of the chamber along the T-piece and through a slot set at an angle of 45°, whereby the tape is delivered to the cloth flat. The zero mark is left protruding from the list of the cloth, close to the board, in proof that the measure starts fair. The yard and fraction of the yard, which is to be read at the end of the tape, gives the measure of the piece in a way which leaves little room for challenge.

The lighter and cheaper cloths are seldom either measured or rolled by hand, but generally by machine. The rolling machine, a power-driven apparatus, draws the cloth over rails and rollers, round a drum, and round the rolling board. There is a marked gain in quickness of operation, although there is need for care. The strong tug of the machine, if started at full speed, will tear light cloth in halves, and, unless the tensioning arrangements are duly adjusted, the machine may pull the cloth out somewhat in length. A mechanical measuring device is coupled with the drum of the rolling machine, and the length of the piece is to be read upon a dial. Under the best conditions a sufficiently accurate measurement is obtainable in this way, but, unless an even speed is maintained the drum and dial-finger, travelling faster at some points than the cloth, results in showing a greater yardage than the actual.

Plaiting may be, and is, done by hand. The simple measure of hooking-up, i.e. of hanging successive folds upon conveniently placed hooks, set a fixed distance apart, is practised in dealing with common cotton grey goods. Hooking is made sometimes to serve as a substitute for measuring, for, if the cloth is hooked in folds each one yard wide, then a count of the total number of plaits gives an approximation of the actual measurement.

Heavier goods are hand-cuttled by means of a cuttling-frame—a simple table of the sort used in hand-rolling.



By courtesy of *Messrs. Wm. Whiteley & Sons, Ltd.*

THE COMBINED RIGGING, PLAITING, AND MEASURING MACHINE

This machine folds the fabric edge to edge down the middle and lays it in flat plaits or cuttles, while simultaneously recording the yardage

To the edges of one end of the table are fixed metal rails marked out in inch divisions. Upon these rails, and secured by thumbscrews, are metal uprights, two to each side. With these and three wooden rods, long enough to reach from side to side of the table, the work can proceed. Two men are required: one to stand at the end of the table and lift forward the cloth in folds; one to stand at the side and to place and withdraw the rods. As the pile of cloth grows higher, the man at the end uses steps, which are provided for the purpose, to improve his liberty of movement.

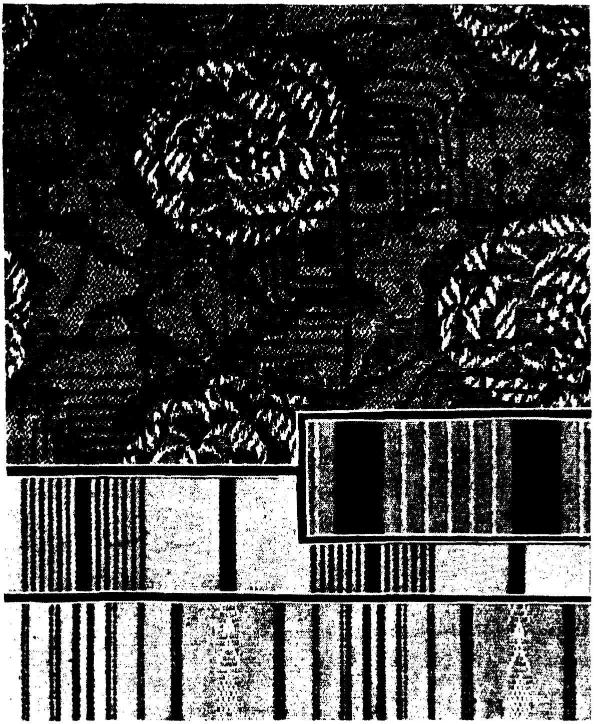
Plaiting is more frequently done by machine. The cloth, led between rollers from the floor, is laid in regular folds by the to-and-fro motion of an oscillating sword. There is a tendency upon the part of the unimproved plaiting machines to lay the cloth in folds, which grow slightly but progressively narrower as the work continues. This disposition is counteracted in the improved pattern of machine by laying the folds not upon a flat but upon a curved table surface, and by causing the table upon which the folds are deposited gradually to subside. A measuring attachment records the total length, and a large part even of the more expensive cloths come to market with their lengths recorded by this apparatus.

The operations of the making-up department of the cloth warehouse usually, but not invariably, include the papering of the goods. The cheapest kinds of cloth are not customarily papered, and those which are thus protected are dealt with in differing ways, in accordance with customs sometimes of very old standing or with the desire of customers.

Tough manilla paper is most often employed and is bought in the sizes most required, to avoid the trouble and expense of cutting. Before applying the paper it is not unusual to pass one or two lengths of tape around the piece, partly upon the score of appearances, partly to hold the loose flap of cloth at the end in position. Tape—white, pink, or of some distinctive colour—is used, and the choice of tape and its consistent use upon all goods, or all goods of the same kind, is merely one of a number of small details deserving of more consideration than is always received.

The choice of paper allows some play for the exercise of taste as well as economy. A pleasing shade of colour is certainly no disadvantage, and it is well to identify the warehouse with one particular shade and quality of paper. Cheapness is always a consideration in an article of supply which brings in no direct return, but economy upon this score is pressed too far when it leads to the labour and expense of avoidable re-papering. Papered pieces are exposed to knocks and dust while in the warehouse, and a paper strong enough to withstand them and to turn out well at the journey's end upon the premises of the customer is worth a reasonable sum of money. The desirability of preserving a style of make-up which identifies the goods with their source is widely recognized. Small details of paper, string, tape, labels, and tickets become associated definitely with the goods and with the warehouse, and attain an importance which should not be disregarded.

Distinctive styles of making-up are associated not only with given warehouses but with given classes of goods, and are demanded by the market. There are, for example, cotton linings, like beetle twills, which are expected to arrive rolled not upon flat boards but round wooden cylinders ; and other linings which are expected not in the rolled form at all, but plaited and folded once or twice within a sheet of stout paper. It is customary in making-up various classes of dress goods to enclose the whole piece in a parcel with the paper concealing both ends. In that case some outward indication of the contents is desirable for the assistance of those who will have to place the goods into their stock. Two means of ready identification are possible : in one system a narrow tab of cloth, left hanging from the end of the piece, is led through the folds of the paper. The alternative is to paste to the front end-fold of the paper



By courtesy of *"The Drapers' Record"*

COTTON FANCIES

Artificial silk is employed to make the broché design in the topmost of the four, and the fabric is printed with a grotesque design in addition. The remaining three are fine striped poplins, ornamented in two instances with threads of more lustrous material

Cloths by Joshua Hoyle & Sons, Ltd.

wrapping a small pattern sufficient to show the design and colour. Cotton is more easily pasted down to paper than wool cloth, and it is important that the bit should be firmly enough affixed to hold. Small portions stamped out in discs, ovals, or rounded oblongs are suitable, and some pains are worth while to ensure that the pattern occurs in relatively the same place upon every piece. The purpose is to allow the stock-keeper to see precisely what colours and designs have been got without taking the cloths out of the bin in which they are placed, and the total effect is neater, if, in the whole pile of pieces before him, the pattern is so placed that one straight line is followed.

The papering of the heavier classes of piece goods is generally so done that the list or edges of the cloth in front are not enclosed, and their colour is of assistance in finding pieces of the desired shade. The circumference and the back of the piece are protected by paper, and the paper is doubled at the front edge in order that it shall not readily tear when the piece is withdrawn from the pile or receptacle in which it rests. To suit the special requirements of markets, more complicated methods of making-up are in use, as when light cloth, like lining material, is rolled round a board, and then manipulated by hand to form a cuttle-fold of a yard or two in length at the top of the piece. The purpose of this top fold is to make examination easy, and in one method the piece is so papered as to allow the fold to be drawn out without disturbance of the rest. The cloth is wrapped in stiff paper, a tape is passed endwise over the rolled portion, and a paper lid is formed by folding and stitching, which can be lifted to allow of the withdrawal of the folded end. The variant is one out of an indefinitely large number established by long custom, and it imposes an appreciable demand upon time and skill. Cloths for some of the export markets are not papered but " tilloted," or sewn inside a lightweight glazed cotton fabric, usually white, and known as tillot cloth. Export cottons in especial need frequently to be labelled with pictorial or other tickets, sometimes in number, by which " chops " the article is identified abroad.

Cottons, bleached or unbleached, and not packed in paper, are frequently marked upon the face plait or at the head of the rolled piece by a stamped design, usually in a single colour and often large. Small quantities are hand-stamped by means of a wooden block, engraved or mounted with brass strip composing the design, and a colour pad. Larger quantities are treated generally at the finishing works upon a simple stamping machine, consisting of a table and a descending platen.

The Stock Room. The operations of making-up being over, the goods pass into the stock either of a general stock room or that of one of the warehouse departments. It is the business of the stock room staff to sort the pieces out according to their kind, and to place them together in the most convenient way. Narrow goods and pieces of small size and weight can be advantageously stored in fixtures. Heavier and larger pieces are customarily arranged in piles, bonded by " headers " and " stretchers " in the same manner as brickwork, for the sake of stability. Pedestals for these piles are provided in the stock rooms, because it is undesirable for more reasons than one to rest the stack upon the bare floor. The pedestals are movable, and should be so placed as to take the utmost advantage of the available space, leaving sufficient room for gangways and the taking down of adjacent piles of piece goods.

The function of the pedestal or " scray," as it is known in some quarters, is apparent. There is traffic between the aisles, both of pedestrians and of wheeled trucks, and it is advisable to raise the foot of the heap above the danger-line. Warehouse floors are dusty and require, usually, to be sprinkled as well as swept, and the pedestal preserves the cloth from damage from these causes. Warehouse stock rooms are too often the reverse of tidy, although the department is one in which the extreme of orderliness can rightly be expected. The goods are of high value, and their care during the time that they remain in stock is the main duty of the department, pending their ultimate transfer to the dispatching or packing room.

The routine of the stock room necessarily depends upon the circumstances of the trade. In some conditions its work is that of sending sooner or later to the dispatching department the goods that have been received from the making-up department unchanged. In other conditions bulk has to be broken. Short lengths have to be cut from whole pieces, and the requisite assortment needed to fill the order has to be assembled together. It is left sometimes to the stock room or the individual department to cut and prepare the shorter lengths. When a half-piece or similarly considerable length has to be cut, the necessary pieces are sent back to the making-up room to receive attention. The matter is one of individual organization and convenience. The sending out of the work to another department can at least be avoided by setting up the necessary tables and apparatus that the work requires.

Orders received from customers are entered in a book for the use of the stock room, and from these entries the outgoing goods are assembled. Goods belonging to the same order are placed together and a docket is placed upon them. The order, being filled, the parcel is " called over " The risk that goods may be sent without entry is always present, and care has to be taken to add the total number of items together as a check upon the whole. These entries form the basis of the invoice to the customer, and an error made in them is likely to pass without notice unless a check system is employed in the dispatching department. In the ordinary way the dispatching department receives the details of the goods to be sent from the stock room, and, although checks can be devised, perfect safeguards are not easily operated where orders are sent out incomplete. One important purpose is served if it is ensured that more is not sent than has been ordered, and that no goods are included in the parcel which are not specified upon the docket supplied to the packing room.

The Packing Room. The same diversity occurs in practice in respect of packing as of making-up. Small lots requiring only paper wrappings are handled in the departments or the stock rooms of some warehouses, leaving to the packing department only those operations which are more difficult to perform. The most desirable course is clearly to pass all packing and dispatching through one set of hands, whether the ultimate container is paper, canvas, or a wooden case.

Single pieces or small parcels consisting of several short lengths of cloth may be protected efficiently by parcelling in paper, or, for longer journeys, paper reinforced by a layer of waterproof material. A choice of such materials is available. Strong paper, coated upon the back with tar, with a backing of loosely woven cotton fabric, to prevent tar from adhering to the contents, is an eligible material. An alternative is oiled waterproof cotton cloth, in which the cloth may be parcelled before using either paper or canvas as an outer wrapper.

Jute canvas is preferable to paper as a packing material, and in packing a single piece it suffices to cut a suitable piece of canvas and sew it along one side and both ends with stout twine, using paper or waterproof cloth as an interior lining. Hessian canvas is bought for the packing department in pieces of 100 yds. or so, and suitable widths and the quality selected are determined by the condition of its use. Cloth intended for delivery within the United Kingdom is packed, usually, in canvas which will serve for several journeys, and the wrappings are charged for and are returnable. Canvas employed for export packing is customarily not returnable. A quality of cloth is chosen, therefore, suitable in length for one long journey, and of as cheap a kind as possible.

Inland consignments are sent usually under label, and the address is given upon a card sewn upon the top of the package. The back of the card is printed with the name of the sender, and, in returning the wrapper, the label is reversed. Wrappers are usually allowed to accumulate for a certain length of time in the warehouse, in order to avoid the expense of returning a multiplicity of small lots, and it is useful to facilitate ready identification by employing canvas of a distinctive kind. Canvas can be bought ready woven with coloured stripes, and these serve to distinguish the wrapper even if the card is lost.

Cloths of most kinds are compressible, and press-packing is virtually indispensable upon goods intended for export, and upon which freight is charged not by weight but by cubic measurement. Press-packing has the effect of making a firmer and more compact package, and the hydraulic press is a central feature of the packing room. The press consists ordinarily of two massive pillars and of a central descending ram actuated either by manual or other power. A stout platform, placed between the pillars, holds the goods to be packed.

The approximate measure of the pile of pieces is taken, and two lengths of canvas are cut, one to lay under the heap and one to lay over it at right angles to the other. Paper, rush mats, oiled or tarred canvas, according to the requirements of the case, are laid between the outer wrapper and the goods, and, when all is in position, the ram is set in motion. The pile of pieces is pressed tight, and then the canvas is sewn round the two sides and ends. The sewing is done by hand with curved packing needles and lengths of cut twine, and when completed the ram is released. The means of compression being taken away, the pressed mass rises somewhat, straining the threads tight, and a trim compact " truss " of cloth remains, which can be thrown end over end without internal movement of the packed pieces.

In trusses, intended for export, light board may advantageously be placed at top and bottom of the package, with thin tough wooden laths between the pieces when packed in double or treble rows. The truss should not be of a total weight that prohibits free handling, and 6 to 7 cwt. may be taken as the ordinary limit of gross weight. Heavier packages, such as must sometimes be made for export, should be packed in bales ; the difference between a truss and a bale being that the bale is hooped with iron, and is furnished with top and bottom external boards as a protection.

Cases for export goods have almost necessarily to be made to measure. Freight being chargeable upon the cubic measurement, waste of space has to be carefully avoided. In some foreign markets import duty is payable upon the gross, not the net, weight, so that a second reason is given for not using packages larger than need be. Cases for goods weighing more than 2 or 3 cwt. need ordinarily to be furnished with wooden battens in addition to strappings of iron hoops; but, as the measurement is taken by the shipping companies outside the battens, they ought not to be used unnecessarily. For the longest sea voyages and for destinations at which cargo may have to lie exposed in the open air, a tin lining to the case is needful, and the lid has to be soldered down after the cloth has been lifted in. The joints need to be airtight and watertight, and the goods, after being nailed down in the outer wooden container, should arrive at their destination as fresh as they were at their source.

Export trusses, bales, and cases travel not under label usually but under marks, consisting of initials, numbers, and some distinctive device. The port of destination, the gross and sometimes the net weight, occasionally the measurement of the package in inches, and special directions as to storage are marked upon the outside, and this is done generally by stencil, brush, and ink. The dockets sent with the goods from the stock room provide the necessary directions upon these points, and the dockets themselves, filled in with particulars of the net and gross weights and the quantities and kinds of packing material used, form material for costing and for invoicing.

Warehouse Books. The books necessary in the warehouse vary according to the conditions under which goods are bought and sold. It is desirable, when that can be arranged, that a complete record should be kept of every individual piece, and that each piece should be numbered and fully accounted for. Where this system can be carried out, a lot book should be opened in which each individual piece has its own line. Entries in the book are made from the manufacturer's invoice. The numbers are consecutive, and the entries show the manufacturer's progressive number for the same piece, the manufacturer's name, the yardage and allowances made by the maker, and the price. The corresponding warehouse lot numbers are rendered in ink upon the invoice. The lot book serves to identify the piece throughout its warehouse career, and a final blank column at the end, to be filled in later from warehouse records, should show the eventual disposal of the piece in question ; whether as returned to the manufacturer or as invoiced outwards to some customer.

The system is most practicable where whole pieces are bought and whole pieces sold. It is not so available where the goods come to the warehouse in a semi-complete condition, and where they are not identifiable readily as separate pieces but only as portions of a block of, say, fifty or more. It is not so simple to work where pieces which come in as units leave in a number of short lengths. In these conditions an account may still be kept, but evidently not upon a single line of the ledger.

The lot book serves as a register of goods taken to account, and where there is no fear of over-complicating the record it may serve also for further internal uses in the warehouse. But primarily the lot book is for the counting-house, and convenience is consulted by opening a duplicate measure book for warehouse purposes. The measure book, also recording the lot number, manufacturer's name, manufacturer's length and allowances, has additional columns in which the result of the warehouse measurement and examination should be recorded. The particulars may be entered from the tickets of the reference patterns, and from this, debits for short measure, for unallowed damages, or the return of goods may be made out.

Pilferage is a prolific source of warehouse loss, and, unless the quantities received are tallied against the quantities delivered and charged outwards, the loss may be both extensive and unknown. The conditions under which work is done in many warehouses facilitate the abstraction of small quantities from stock, and, rather than face the elaborate systems of check and countercheck which might help to prevent embezzlement, warehouse managers endeavour to make it difficult for goods to be carried out of the premises. A gatekeeper is appointed, and without first showing a permit no one is allowed to carry outward parcels through the door.

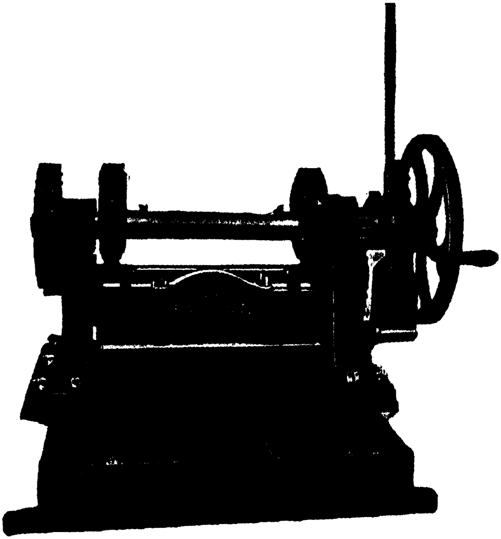
These lot or measure books are independent of the order book, in which orders are entered and in which goods as they are passed and applied to customer's orders are marked off. They are separate also from the packing book, in which goods are entered outwards for their final dispatch. The packing book is the one from which dockets are made out for the packing department, and from which also the invoices are compiled. The book supplies details of the contents and marks and numbers of every package, and is distinct from the delivery book, in which the marks, numbers, and consignee's name are recorded, and in which a signature is obtained from the carter taking delivery of the consignment.

Stock books, in which a running record is kept of goods entered into or remaining in stock, are a separate departmental concern, and in dealing with articles of regular stock, as distinct from goods upon order awaiting delivery, it is of advantage to employ guard books containing pasted-down samples. They form a more or less accurate perpetual inventory, and it is of convenience to see immediately from them patterns of the articles to which the record relates. The desirability of seeing patterns at the same time as numbers is experienced also in other connections.

Experience shows it to be safer in referring to qualities and shades not to depend upon numbers alone, but to institute a check by the comparison of patterns. In some well-ordered warehouses it is an inflexible rule never to order cloths from a manufacturer, or shades from a dyer, without attaching to the sheet a small cutting of the article in question, with the manufacturer's number as well as the warehouse number for the same object.

The Pattern Department. The pattern department of the warehouse is concerned not with goods in bulk but with samples, including those upon which the sale of goods is founded. The size and scale of the department depend upon the condition under which the work of the warehouse is carried on. The selection and ordering of patterns in advance of the season is usually not the business of the department but of the cloth buyer, and the work of the pattern-room begins when the patterns arrive. It is part of the duty of the department to give new quality numbers and shade numbers to patterns received from manufacturers. The patterns are cut, and small cuttings taken from them are pasted down in guard books and numbered consecutively ; the numbers being those by which the articles will be subsequently known in warehouse work.

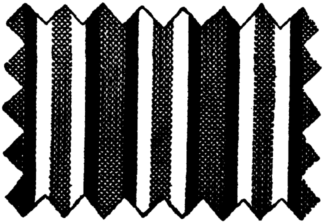
If these patterns, or certain of them, are to be sent out to travellers or customers, it is the business of the department to carry out the detail work. The patterns ordinarily require to be further cut, either by means of a hand-knife and straight edge or by guillotine machine. They require to be ticketed with their numbers and to be joined together by means of a metal fastener, a card, or a cloth and card binding. The remainders need to be filed for ready reference, and small remainders can often best be stored away between a couple of boards, such as are used for rolling piece goods.



By courtesy of *Messrs. J. T. Hardaker, Ltd.*

A CLOTH GUILLOTINE FOR THE PATTERN-ROOM

Fitted with a serrated knife to produce the gimped edge shown upon the cloth pattern below



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SERRATED EDGES RESIST FRAYING AND IMPROVE THE APPEARANCE OF PATTERNS

Very large numbers of duplicate patterns are required under some systems of trade, notably by those who furnish customers with "bunches," from which orders for small quantities may be sent. The work is not always done solely in the warehouse. There are pattern-card makers, working for the trade, who carry on pattern-mounting as a business, usually in association with printing or lithography.

The work of the pattern man includes the mounting of small patterns upon cards, with a " feeler " sufficient to show the quality and bits which exhibit the shades or changes of design. Different warehouses have their own styles of making up patterns, and, as the pattern room is that in which the work can be done in the most professional manner, patterns are sent in from the departments to be put into the neatest and most taking form. The patterns handled are of two chief kinds—those which are made by the manufacturer as patterns in advance of the goods, and pattern lengths cut from stock. The work is of a routine character calling for manual dexterity and neatness. It is indispensable work, but it is not more highly remunerated than warehouse work at large, and much of it is within the compass of boys and girls.

Warehouse Design. In the nature of the case a large proportion of cloth warehouses require to be situated in a central position and in premises already existent. Crowding accounts for much that must be reckoned as defects in warehouse design. If ground space were not of importance warehouses would not be constructed upon several levels but upon one. The ideal warehouse would be one of a single floor with one door for the entrance of goods and another for exit. In course of their progress through the warehouse goods would never be turned back, but continue from one department to another until the time of their final delivery. But ground space is of high importance in the congested centres of towns, and it becomes remunerative accordingly to make use of mechanical power to overcome the disadvantages of space.

Goods are received at ground-level and preferably at a delivery dock, which brings the height of the warehouse floor to that of the carts upon which the pieces arrive. If they can be handled throughout upon one storey then so much the better, for it costs money to operate hoists, and hoist-wells increase fire risks materially. But hoists are usually inevitable and floor has to be piled on floor, and in these conditions it is common to make the first lift a long one and to carry goods when they arrive direct to the top of the building. The making-up department is thus ordinarily next to the roof. The stock rooms are upon the intermediate floors, and the dispatching and packing departments, if not accommodated upon the ground floor, may advisably be relegated to the basement.

Hoists are requisite to carry goods upstairs, but chutes serve in some instances to bring cloths downstairs. Grey cloths outward bound to finishers from Manchester warehouses are commonly made to dispense with both. The lumps or pieces ,of unfinished cotton are dropped from the open window to the cart beneath. The method is not available for carefully papered and made-up goods, and the chute, leading from floor to floor, takes up an amount of room and involves an amount of risk which makes it doubtfully better than the straight hoist. The modern hoist, protected by safety devices to prevent unchecked falls as well as the opening of doors when the cage is at another level, improves upon the old hoist worked by man labour and liable to runaway descents.

The counting-house and pattern rooms may preferably be upon the ground or first floor, as may the showrooms, buyers' offices, or other departments much visited by persons from the outside. It is desirable, so far as possible, to reduce the passage of outsiders through the stock rooms and departments.

Although good natural lighting is of extreme advantage in examining and displaying cloths, strong illumination is not requisite in rooms where goods are stored. Strong sunlight is accompanied by sun-heat and a high temperature involves drying and a consequent loss of weight. All textiles are in their degree hygroscopic, and a certain allowance of moisture is proper to them, although damp surroundings are more to be feared than over-dry ones, for damp leads to mildew. Strong sunlight is detrimental to colours, and the best room for the storage of cloth is not one upon which the rays of the sun beat fiercely. A mild light, sufficient to show the presence of dust, and an even temperature of 60° F. or below, is to be desired. The artificial illumination of the warehouse should have regard to the presence of piles of cloth, which may need to be high, and of aisles in which it is important to have light enough to read the piece tickets. The source of light should preferably be high and the rays diffused, and this combination is most easily achieved with electric lamps of which the suspension can be varied. Warehouse work is done chiefly by day, but it has to be carried on in fogs and dark weather.

Moths are less destructive in this climate than in some others, but the habit of certain species is to seek out soft materials in which they may lay their eggs. The larvæ bore their way out from the place of concealment, leaving holes marking their passage behind. The old-fashioned, and not altogether ineffective, remedy was to hang bunches of fresh wormwood from the ceilings of rooms containing enticing kinds of cloth. Naphthaline and other preventives have been applied with more or less success, but solutions are now obtainable upon which greater reliance can be placed, and cloths can be impregnated in the finishing process with chemicals repugnant to the pests.

Warehouse Careers. Boys entering warehouse work generally do so immediately upon leaving school at about age 15. They are attached to one department, and acquire experience, more or less varied, according to the custom of the establishment. They see, if they do not actually practise, the routine of the pattern department, the making-up and packing departments, the stock room, and the office. There are few absolute barriers to transference from one department to another, and a boy starting in one may be passed quickly to another. The manual work of the pattern and packing rooms affords least hope of promotion, and direct contact with the sale and purchase of goods the most.

From doing the errands, sweeping the floor, arranging and tidying the stock, and writing at the entering desk, the boy gradually comes into more important functions. He is directly under the eye of his chief, the departmental buyer, and may aspire in time to become first hand in his department and to assist the buyer in his interviews with manufacturers and their agents, or with visiting customers. From this point of vantage his opportunities are twofold. Possessing the gifts which are likely to make him a good salesman, he may find himself becoming a commercial traveller; or after waiting, possibly, some considerable time, succeeding to the position of buyer. In the alternative he is likely to remain a not very highly paid warehouseman.

Entering the warehouse thus early, the young man acquires a sense of how business is done with a certain knowledge of goods and their relative saleability. He has opportunities of picking up additional information from his elders and from warehouse callers, but for a wider knowledge of how cloths are made he is dependent much upon his own reading or upon attendance at technical lectures and evening classes. Spare-time efforts for the improvement of his knowledge of goods or attendance at foreign language classes are, if not indispensable, at least of immense assistance. It needs to be realized that far more British textiles are sold abroad than at home, and that mastery of such languages as French, German, and Spanish is required in the export houses. England is the chief export market for manufacturers, for example, of French silks, and knowledge of the language of the country from which goods are brought becomes in some circumstances highly valuable to cloth buyers. Opportunities of advancement are useful only to those competent to take advantage of them, and full readiness to accept them demands more than work in warehouse hours.

It is a disadvantage of wholesale warehouse training that the young man is ordinarily brought too little into close contact with customers to learn the craft of salesmanship. For that reason, experience behind a retail counter is often regarded as valuable, and particularly to those whose aim is to become good travellers in the home trade. More openings exist for travellers than for buyers, although which of the two positions is the more desirable depends largely upon individuality. The main business of both is to maintain and improve turnovers. It is for the buyer to select and purchase the goods which the traveller can sell, and for the traveller to see that they are sold at the right time and in the right quantity. The duties are complementary the one to the other, and the work of both parties is assessed finally upon its commercial return. Upon the whole, the work of the buyer may be thought to present the greater opportunities, but there is no rule to that effect ; and the duties and responsibilities of buyers vary considerably.

The work of the buyer, although largely selective, consisting in choosing among the several styles that are put before him by suppliers, is in some circumstances adaptive or definitely creative. As a student of the market, sensitive to its tendencies, he is aware of the features which have influenced the sale of his recent purchases. Part of his business is to know what styles are most likely to be successful next and to suggest amalgamation of popular features, so uniting in new cloths characteristics which have proved favourite in old ones. Alert manufacturers think no time lost that is spent in comparing ideas with practical men and receiving suggestions as to tendencies. Entirely novel departures owe their success in practice to the approval they receive from trade buyers, and, in a good many instances, the novelty has been the outcome of a suggestion thrown out by the buyer and carried into effect by the manufacturer.

There is an obvious difference of position between the buyer, who has to place contracts in advance of the season, and one who has to make the best bargain where an offer to purchase has been received. Buyers are accorded widely varying degrees of responsibility by their employers, and have not necessarily a free hand to make all the purchases that their individual judgments would dictate. They must, in any event, be shrewd judges of the suitability of the goods that they see, and of values. They have to judge from patterns beforehand

and to verify the quality of the cloths when received; or, in the event of inferiority in the goods delivered, to determine the further course to be taken in rejecting them or accepting them, subject to a suitable allowance off the price. "Cold pig," the bugbear of the buyer's life, is the residue of stock which refuses to sell, and becomes a dead-weight upon the resources and profits of his department.

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